

**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants



September 14, 2011

John Long  
AMEC/Geomatrix  
600 University Suite 1020  
Seattle, WA 98101

**RE: Client Project: Former Rhone Poulenc- 8769 Shoreline Investigation**  
**ARI Job Number: TK57, TK58**

Dear John:

Please find enclosed the final data package for samples for the project referenced above.  
ARI received six water samples and one trip blank on August 31, 2011.

Please refer to the case narrative for details on the analyses of these samples.

A copy of this package will be kept on file at ARI. If you have questions or problems,  
please feel free to contact me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Kelly Bottem  
Client Services Manager  
206/695-6211  
kellyb@arilabs.com

Enclosures

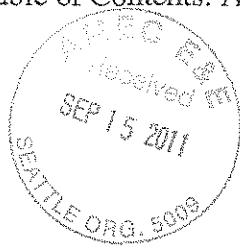
cc: file TK57\_TK58

KFB/esj

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Client: Amec Geomatrix Inc.

Project: 8769 FRP 2011 Shoreline Investigation



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Re  
Signature

September-12-2011  
Date

Chain of Custody Documentation

ARI Job ID: TK57, TK58

## Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



# Cooler Receipt Form

ARI Client: AMEC

COC No(s): \_\_\_\_\_  NA

Assigned ARI Job No: JKST  TKSB

## Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?  YES  NO

Were custody papers included with the cooler?  YES  NO

Were custody papers properly filled out (ink, signed, etc.)  YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 3.7

If cooler temperature is out of compliance fill out form 00070F

Cooler Accepted by: AV Date: 8/31/11 Time: 1610

*Complete custody forms and attach all shipping documents*

## Log-In Phase:

Was a temperature blank included in the cooler?  YES  NO

What kind of packing material was used? ...  Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)?  YES  NO

Were all bottles sealed in individual plastic bags?  YES  NO

Did all bottles arrive in good condition (unbroken)?  YES  NO

Were all bottle labels complete and legible?  YES  NO

Did the number of containers listed on COC match with the number of containers received?  YES  NO

Did all bottle labels and tags agree with custody papers?  YES  NO

Were all bottles used correct for the requested analyses?  YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...  YES  NO

Were all VOC vials free of air bubbles?  YES  NO

Was sufficient amount of sample sent in each bottle?  YES  NO

Date VOC Trip Blank was made at ARI...  NA  Date: 8/30/11

Was Sample Split by ARI:  NA  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: AV Date: 8/31/11 Time: 1655

*\*\* Notify Project Manager of discrepancies or concerns \*\**

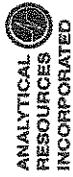
Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

## Additional Notes, Discrepancies, & Resolutions:

By:

Date:

<small>Small Air Bubbles ~2mm</small>	<small>Peabubbles 2-4 mm</small>	<small>LARGE Air Bubbles ≥ 4 mm</small>	<small>Small → "sm" Peabubbles → "pb" Large → "lg" Headspace → "hs"</small>



ZARI Job No: TK58

Inquiry Number: NONE  
 Analysis Requested: 09/01/11  
 Contact: Long, John  
 Client: Amec Geomatrix Inc.  
 Logged by: AV  
 Sample Set Used: Yes-481  
 Validatable Package: yes  
 Deliverables:

PC: Kelly  
 VTSR: 08/31/11

Project #: 8769  
 Project: FRP 2011 Shoreline Investigation  
 Sample Site:  
 SDG No:  
 Analytical Protocol: In-house

LOGONUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	TRN <2	NO23 <2	TOC <2	S2 >9	AK102/Fe2+ <2	DMET DOC <2	FLT FLT	PARAMETER TO	ADJUSTED LOT	AMOUNT NUMBER	ADDED	DATE/BY	
11-18921	FRP-083111-001																				
TK58A																					
11-18922	FRP-083111-002																				
TK58B																					
11-18923	FRP-083111-003																				
TK58C																					
11-18924	FRP-083111-004																				
TK58D																					
11-18925	FRP-083111-005																				
TK58E																					
11-18926	FRP-083111-006																				
TK58F																					

11-18921 083111

Checked By AN Date 8/31/11



# Cooler Receipt Form

ARI Client: AMEC

COC No(s): \_\_\_\_\_  NA

Assigned ARI Job No: TK57

## Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?  YES  NO

Were custody papers included with the cooler?  YES  NO

Were custody papers properly filled out (ink, signed, etc.)  YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 3.7

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 209416019

Cooler Accepted by: AV Date: 8/31/11 Time: 1610

*Complete custody forms and attach all shipping documents*

## Log-In Phase:

Was a temperature blank included in the cooler?  YES  NO

What kind of packing material was used? ...  Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)?  YES  NO

Were all bottles sealed in individual plastic bags?  YES  NO

Did all bottles arrive in good condition (unbroken)?  YES  NO

Were all bottle labels complete and legible?  YES  NO

Did the number of containers listed on COC match with the number of containers received?  YES  NO

Did all bottle labels and tags agree with custody papers?  YES  NO

Were all bottles used correct for the requested analyses?  YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...  NA  YES  NO

Were all VOC vials free of air bubbles?  NA  YES  NO

Was sufficient amount of sample sent in each bottle?  NA  YES  NO

Date VOC Trip Blank was made at ARI...  NA  E/29/11

Was Sample Split by ARI:  NA  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: AV Date: 8/31/11 Time: 1655

*\*\* Notify Project Manager of discrepancies or concerns \*\**

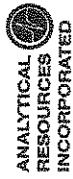
Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

## Additional Notes, Discrepancies, & Resolutions:

By:

Date:

<input type="checkbox"/> Small Air Bubbles ~2mm * * *	<input type="checkbox"/> Peabubbles 2-4 mm * * *	<input type="checkbox"/> Large Air Bubbles > 4 mm * * *	Small → "sm" Peabubbles → "pb" Large → "lg" Headspace → "hs"



ARI Job No: TK57

Inquiry Number:  
Analysis Requested: 09/01/11  
Contact: Long, John  
Client: Geomatrix, Inc.  
Logged by: AV  
Sample Set Used: Yes-247  
Validatable Package: Yes  
Deliverables:

PC: Kelly  
VTSR: 08/31/11

Project #: 8769  
Project: FRP 2011 Shoreline Investigation  
Sample Site:  
SDG No:  
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	AK162/Fe2+ <2	DMET <sup>+</sup> FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE / BY
11-18914	FRP-083111-001						TOT													
TK57A	FRP-083111-002						TOT													
11-18915	FRP-083111-003						TOT													
TK57B	FRP-083111-004						TOT													
11-18916	FRP-083111-005						TOT													
TK57C	FRP-083111-006						TOT													
11-18917	FRP-083111-007						TOT													
TK57D	FRP-083111-008						TOT													
11-18918	FRP-083111-009						TOT													
TK57E	FRP-083111-010						TOT													
11-18919	FRP-083111-011						TOT													
TK57F	FRP-083111-012						TOT													

TK57 : 000007

Checked By: JK Date: 8/31/11

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: TK57, TK58

## Case Narrative

**AMEC/Geomatrix**

**Client Project: Former Rhone Poulenc- 8769 Shoreline Investigation**

**ARI Job Number: TK57, TK58**

**September 14, 2011**

### Sample Receipt:

Please find enclosed the original chain of custody (COC) record and analytical results for the project referenced above. Analytical Resources, Inc. accepted six water samples and one trip blank in good condition on 8/31/11. Please see the enclosed Cooler Receipt Form for further details.

### Volatiles by 8260C

The samples were analyzed on 9/1/11 - within the method recommended holding time.

**Initial calibration (s):** All analytes of interest were within method acceptance criteria.

**Continuing calibration (s):** All analytes of interest were within method acceptance criteria.

**LCS/LCSD/RPDs:** All percent recoveries and RPDs were within compliance.

**Surrogates:** All surrogate recoveries were within control limits.

**Method Blank (s):** The method blank contained methylene chloride at a value less than the reporting limit. All associated samples that contain this analyte have been flagged with a "B" qualifier.

**Samples:** There were no anomalies associated with these samples.

### Metals Analysis (6010, 200.8 and 7000 series)

The samples were digested on 9/2/11 - within the method recommended holding time and analyzed between 9/7 and 9/9/11.

**Initial calibration (s):** All analytes of interest were within method acceptance criteria.

**Continuing calibration (s):** All analytes of interest were within method acceptance criteria.

**Internal Standards:** Internal standard areas were in control.

**LCS/LCSD/RPDs:** The percent recoveries and RPDs are in control.

**AMEC/Geomatrix**

**Client Project: Former Rhone Poulenc- 8769 Shoreline Investigation**

**ARI Job Number: TK57 and TK58**

**September 14, 2011**

**Page 2**

**Method Blank (s):** The method blank was free of contamination.

**Samples:** There were no anomalies associated with these samples.

**Matrix spike/ Sample duplicate/ RPD(s):** The percent recoveries and RPDs were in control.

**pH by method 150.1:**

The samples were analyzed on 8/31/11 within method recommended holding time.

**Initial calibration (s):** All analytes of interest were within method acceptance criteria.

**LCS/LCSD/RPDs:** The percent recovery is in control.

**Sample duplicate/ RPD(s):** The RPD is in control.

**Sample ID Cross Reference Report****ANALYTICAL  
RESOURCES  
INCORPORATED**

ARI Job No: TK57

Client: Geomatrix, Inc.

Project Event: 8769

Project Name: FRP 2011 Shoreline Investigation

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. FRP-083111-001	TK57A	11-18914	Water	08/31/11 10:20	08/31/11 16:10
2. FRP-083111-002	TK57B	11-18915	Water	08/31/11 10:25	08/31/11 16:10
3. FRP-083111-003	TK57C	11-18916	Water	08/31/11 11:15	08/31/11 16:10
4. FRP-083111-004	TK57D	11-18917	Water	08/31/11 12:40	08/31/11 16:10
5. FRP-083111-005	TK57E	11-18918	Water	08/31/11 15:25	08/31/11 16:10
6. FRP-083111-006	TK57F	11-18919	Water	08/31/11 15:45	08/31/11 16:10
7. Trip Blanks	TK57G	11-18920	Water	08/31/11	08/31/11 16:10

Printed 08/31/11

TK57:083111

**Sample ID Cross Reference Report**ANALYTICAL  
RESOURCES  
INCORPORATED

ARI Job No: TK58

Client: Amec Geomatrix Inc.

Project Event: 8769

Project Name: FRP 2011 Shoreline Investigation

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. FRP-083111-001	TK58A	11-18921	Water	08/31/11 10:20	08/31/11 16:10
2. FRP-083111-002	TK58B	11-18922	Water	08/31/11 10:25	08/31/11 16:10
3. FRP-083111-003	TK58C	11-18923	Water	08/31/11 11:15	08/31/11 16:10
4. FRP-083111-004	TK58D	11-18924	Water	08/31/11 12:40	08/31/11 16:10
5. FRP-083111-005	TK58E	11-18925	Water	08/31/11 15:25	08/31/11 16:10
6. FRP-083111-006	TK58F	11-18926	Water	08/31/11 15:45	08/31/11 16:10

Printed 08/31/11

TK57:00012



## Data Reporting Qualifiers

Effective 2/14/2011

### Inorganic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but  $\geq$  the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is  $\leq$  5 times the Reporting Limit and the replicate control limit defaults to  $\pm 1$  RL instead of the normal 20% RPD

### Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).



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- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NR Spiked compound recovery is not reported due to chromatographic interference
- NS The flagged analyte was not spiked into the sample
- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
- X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
- Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**



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## Geotechnical Data

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting



**Spike Recovery Control Limits for Analysis of Aqueous Samples  
Volatile Organic Compounds (VOA) EPA SW-846 Methods 8260C  
10 mL Purge Volume<sup>(1,6)</sup>**

Effective: 8/30/2010

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use. <http://www.arilabs.com/portal/downloads/ARI-CLs.zip>

	ARI Control Limits	ARI ME Control Limits <sup>(2)</sup>
<b>LCS Spike Recovery<sup>(5)</sup></b>		
Dichlorodifluoromethane	69 - 122	60 - 131
Chloromethane	76 - 120	69 - 123
Vinyl Chloride	80 - 120	75 - 123
Bromomethane	71 - 120	63 - 129
Chloroethane	80 - 120	75 - 124
1,1,2-Trichloro-1,2,2-trifluoroethane	80 - 121	76 - 128
Acrolein	69 - 126	60 - 136
Acetone	71 - 120	64 - 120
1,1-Dichloroethene	80 - 120	79 - 122
Bromoethane	80 - 120	80 - 121
Methyl Iodide	76 - 120	69 - 127
Methylene Chloride	80 - 120	77 - 120
Acrylonitrile	79 - 120	74 - 120
Methyl tert-Butyl Ether	80 - 120	77 - 121
Carbon Disulfide	80 - 120	78 - 121
trans-1,2-Dichloroethene	80 - 120	80 - 120
Vinyl Acetate	80 - 120	76 - 120
1,1-Dichloroethane	80 - 120	80 - 120
2-Butanone	80 - 120	76 - 120
2,2-Dichloropropane	80 - 120	77 - 120
cis-1,2-Dichloroethene	80 - 120	80 - 120
Chloroform	80 - 120	80 - 120
Bromodichloromethane	80 - 120	80 - 120
1,1,1-Trichloroethane	80 - 120	80 - 120
1,1-Dichloropropene	80 - 120	80 - 120
Carbon Tetrachloride	80 - 120	80 - 123
1,2-Dichloroethane	80 - 120	80 - 120
Benzene	80 - 120	80 - 120
Trichloroethene	80 - 120	80 - 120
1,2-Dichloropropane	80 - 120	80 - 120
Bromochloromethane	80 - 120	80 - 120
Dibromomethane	80 - 120	80 - 120
2-Chloroethylvinylether	80 - 120	75 - 120
4-Methyl-2-Pentanone	80 - 120	78 - 120
cis-1,3-Dichloropropene	80 - 120	80 - 120
Toluene	80 - 120	80 - 120
trans-1,3-Dichloropropene	80 - 120	80 - 120



2-Hexanone	80 - 120	75 - 120
1,1,2-Trichloroethane	80 - 120	80 - 120
1,3-Dichloropropane	80 - 120	80 - 120
Tetrachloroethene	80 - 120	80 - 120
Dibromochloromethane	80 - 120	80 - 120
Ethylene Dibromide	80 - 120	80 - 120
Chlorobenzene	80 - 120	80 - 120
Ethylbenzene	80 - 120	80 - 121
1,1,2,2-Tetrachloroethane	80 - 120	78 - 120
m,p-Xylene	80 - 120	80 - 120
o-Xylene	80 - 120	80 - 120
Styrene	80 - 120	80 - 122
Trichlorofluoromethane	80 - 120	78 - 123
Isopropylbenzene	80 - 120	79 - 121
Bromoform	80 - 120	79 - 120
1,1,1,2-Tetrachloroethane	80 - 120	80 - 120
1,2,3-Trichloropropane	80 - 120	77 - 120
trans-1,4-Dichloro-2-butene	74 - 122	66 - 130
n-Propylbenzene	80 - 120	80 - 120
Bromobenzene	80 - 120	78 - 120
1,3,5-Trimethylbenzene	80 - 120	80 - 120
2-Chlorotoluene	80 - 120	80 - 120
4-Chlorotoluene	80 - 120	80 - 120
tert-Butylbenzene	80 - 120	80 - 121
1,2,4-Trimethylbenzene	80 - 120	80 - 120
sec-Butylbenzene	80 - 120	80 - 121
4-Isopropyltoluene	80 - 120	80 - 123
1,3-Dichlorobenzene	80 - 120	80 - 120
1,4-Dichlorobenzene	80 - 120	80 - 120
n-Butylbenzene	80 - 120	80 - 122
1,2-Dichlorobenzene	80 - 120	80 - 120
1,2-Dibromo-3-chloropropane	76 - 120	71 - 120
1,2,4-Trichlorobenzene	77 - 120	71 - 120
Hexachloro-1,3-butadiene	77 - 120	70 - 127
Naphthalene	76 - 120	70 - 120
1,2,3-Trichlorobenzene	79 - 120	74 - 120
<b>MB/LCS Surrogate Recovery</b>		
Dibromofluoromethane	80 - 120	(3)
d4-1,2-Dichloroethane	80 - 120	(3)
d8-Toluene	80 - 120	(3)
4-Bromofluorobenzene	80 - 120	(3)
d4-1,2-Dichlorobenzene	80 - 120	(3)
<b>Sample Surrogate Recovery</b>		
Dibromofluoromethane	80 - 120	(3)



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d4-1,2-Dichloroethane	<b>80 - 120</b>	(3)
d8-Toluene	<b>80 - 120</b>	(3)
4-Bromofluorobenzene	<b>80 - 120</b>	(3)
D4-1,2-Dichlorobenzene	<b>80 - 120</b>	(3)

(1) Control Limits calculated using all data generated 7/1/09 through 6/30/10.

(2) ME = A **marginal exceedance** defined in the NELAC Standard<sup>(4)</sup> as beyond the LCS-CL but still within the ME limits. ME limits are between 3 and 4 standard deviations around the mean. A maximum of four marginal exceedances are acceptable. Five or more marginal exceedances require corrective action.

(3) Marginal Exceedances not allowed for surrogate standards. A corrective action is required for each surrogate recovery outside of the control limit range.

(4) **2003 NELAC Standard (EPA/600/R-04/003), July 2003**, Chapter 5, pages 251-252.

(5) Laboratory Control Sample (LCS) spike recovery control limits also used as advisory control limits for sample matrix spike (MS) analyzes. MS recovery values are advisory and not used to assess the acceptability of an analytical batch.

(6) Highlighted control limits (**bold font**) are adjusted from the calculated values as follows:

a) ARI does not use control limits < 10 for the lower limit or < 100 for the upper limit.

b) Control limits for analyzes with no separate preparation procedure are adjusted to reflect the minimum uncertainty in the calibration of the instrument allowed by the referenced analytical method.



## Summary of Laboratory Control Limits Metals Analyses (All Methods & Sample Matrices)

Effective 5/1/09

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use. <http://www.arilabs.com/portal/downloads/ARI-CLs.zip>

Element	Matrix Spike Recovery	LCS Recovery	Replicate RPD
Aluminum	75 - 125	80 - 120	≤ 20%
Antimony	75 - 125	80 - 120	≤ 20%
Arsenic	75 - 125	80 - 120	≤ 20%
Barium	75 - 125	80 - 120	≤ 20%
Beryllium	75 - 125	80 - 120	≤ 20%
Boron	75 - 125	80 - 120	≤ 20%
Cadmium	75 - 125	80 - 120	≤ 20%
Calcium	75 - 125	80 - 120	≤ 20%
Chromium	75 - 125	80 - 120	≤ 20%
Cobalt	75 - 125	80 - 120	≤ 20%
Copper	75 - 125	80 - 120	≤ 20%
Iron	75 - 125	80 - 120	≤ 20%
Lead	75 - 125	80 - 120	≤ 20%
Magnesium	75 - 125	80 - 120	≤ 20%
Manganese	75 - 125	80 - 120	≤ 20%
Mercury	75 - 125	80 - 120	≤ 20%
Nickel	75 - 125	80 - 120	≤ 20%
Potassium	75 - 125	80 - 120	≤ 20%
Selenium	75 - 125	80 - 120	≤ 20%
Silica	75 - 125	80 - 120	≤ 20%
Silver	75 - 125	80 - 120	≤ 20%
Sodium	75 - 125	80 - 120	≤ 20%
Strontium	75 - 125	80 - 120	≤ 20%
Thallium	75 - 125	80 - 120	≤ 20%
Vanadium	75 - 125	80 - 120	≤ 20%
Zinc	75 - 125	80 - 120	≤ 20%



## Spike Recovery Control Limits for Conventional Wet Chemistry

Effective 5/1/09

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use. <http://www.arilabs.com/portal/downloads/ARI-CLs.zip>

Sample Matrix:	ARI's Control Limits	
	Water	Soil / Sediment
<b>Matrix Spike Recoveries</b>	% Recovery	% Recovery
Ammonia	75 - 125	75 - 125
Bromide	75 - 125	75 - 125
Chloride	75 - 125	75 - 125
Cyanide	75 - 125	75 - 125
Ferrous Iron	75 - 125	75 - 125
Fluoride	75 - 125	75 - 125
Formaldehyde	75 - 125	75 - 125
Hexane Extractable Material	-- -- --	78 - 114
Hexavalent Chromium	75 - 125	75 - 125
Nitrate/Nitrite	75 - 125	75 - 125
Oil and Grease	75 - 125	75 - 125
Phenol	75 - 125	75 - 125
Phosphorous	75 - 125	75 - 125
Sulfate	75 - 125	75 - 125
Sulfide	75 - 125	75 - 125
Total Kjeldahl Nitrogen	75 - 125	75 - 125
Total Organic Carbon	75 - 125	75 - 125
<b>Duplicate RPDs</b>		
Acidity	±20%	±20%
Alkalinity	±20%	±20%
BOD	±20%	±20%
Cation Exchange	±20%	±20%
COD	±20%	±20%
Conductivity	±20%	±20%
Salinity	±20%	±20%
Solids	±20%	±20%
Turbidity	±20%	±20%

Volatile Analysis  
Report and Summary QC Forms

ARI Job ID: TK57, TK58

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 1 of 2

Sample ID: FRP-083111-001  
SAMPLE

Lab Sample ID: TK57A

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18914

Project: FRP 2011 Shoreline Investigation  
8769

Matrix: Water

Date Sampled: 08/31/11

Data Release Authorized: *R*

Date Received: 08/31/11

Reported: 09/06/11

Instrument/Analyst: NT3/PKC

Sample Amount: 10.0 mL

Date Analyzed: 09/01/11 20:53

Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	< 0.5 U
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	< 0.2 U
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloropropane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 U
108-88-3	Toluene	0.06	0.2	< 0.2 U
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	< 0.4 U
95-47-6	o-Xylene	0.06	0.2	< 0.2 U
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: FRP-083111-001  
SAMPLE

Lab Sample ID: TK57A  
LIMS ID: 11-18914  
Matrix: Water  
Date Analyzed: 09/01/11 20:53

QC Report No: TK57-Geomatrix, Inc.  
Project: FRP 2011 Shoreline Investigation  
8769

CAS Number	Analyte	MDL	RL	Result
96-18-4	1,2,3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1,4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	1,2,4-Trimethylbenzene	0.06	0.2	< 0.2 U
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromo-chloromethane	0.07	0.2	< 0.2 U
594-20-7	2,2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1,3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1,2,4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1,2,3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	98.1%
Bromofluorobenzene	105%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 1 of 2

Sample ID: FRP-083111-002  
SAMPLE

Lab Sample ID: TK57B  
LIMS ID: 11-18915  
Matrix: Water  
Data Release Authorized: *BB*  
Reported: 09/06/11

QC Report No: TK57-Geomatrix, Inc.  
Project: FRP 2011 Shoreline Investigation  
8769

Date Sampled: 08/31/11  
Date Received: 08/31/11

Instrument/Analyst: NT3/PKC  
Date Analyzed: 09/01/11 21:20

Sample Amount: 10.0 mL  
Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	< 0.5 U
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	< 0.2 U
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloropropane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 U
108-88-3	Toluene	0.06	0.2	< 0.2 U
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoro	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	< 0.4 U
95-47-6	o-Xylene	0.06	0.2	< 0.2 U
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

MMW

**ORGANICS ANALYSIS DATA SHEET**

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: FRP-083111-002  
**SAMPLE**

Lab Sample ID: TK57B  
LIMS ID: 11-18915  
Matrix: Water  
Date Analyzed: 09/01/11 21:20

QC Report No: TK57-Geomatrix, Inc.  
Project: FRP 2011 Shoreline Investigation  
8769

CAS Number	Analyte	MDL	RL	Result
96-18-4	1,2,3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1,4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	1,2,4-Trimethylbenzene	0.06	0.2	< 0.2 U
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromochloromethane	0.07	0.2	< 0.2 U
594-20-7	2,2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1,3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1,2,4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1,2,3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in µg/L (ppb)

**Volatile Surrogate Recovery**

d4-1,2-Dichloroethane	102%
d8-Toluene	98.5%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

## ORGANICS ANALYSIS DATA SHEET

Volatile by Purge & Trap GC/MS-Method SW8260C  
Page 1 of 2
**ANALYTICAL  
RESOURCES  
INCORPORATED**


Sample ID: FRP-083111-003

SAMPLE

Lab Sample ID: TK57C

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18916

Project: FRP 2011 Shoreline Investigation  
8769

Matrix: Water

Date Sampled: 08/31/11

Data Release Authorized: 

Date Received: 08/31/11

Reported: 09/06/11

Instrument/Analyst: NT3/PKC

Sample Amount: 10.0 mL

Date Analyzed: 09/01/11 21:47

Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	< 0.5 U
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	< 0.2 U
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloropropane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pantanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 U
108-88-3	Toluene	0.06	0.2	< 0.2 U
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoro	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	< 0.4 U
95-47-6	o-Xylene	0.06	0.2	< 0.2 U
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

*MJW*

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Page 2 of 2

Sample ID: FRP-083111-003

SAMPLE

Lab Sample ID: TK57C

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18916

Project: FRP 2011 Shoreline Investigation

Matrix: Water

8769

Date Analyzed: 09/01/11 21:47

CAS Number	Analyte	MDL	RL	Result
96-18-4	1,2,3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1,4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	1,2,4-Trimethylbenzene	0.06	0.2	< 0.2 U
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromochloromethane	0.07	0.2	< 0.2 U
594-20-7	2,2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1,3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1,2,4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1,2,3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	98.5%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	101%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

## ORGANICS ANALYSIS DATA SHEET

Volatile by Purge & Trap GC/MS-Method SW8260C  
Page 1 of 2
**ANALYTICAL  
RESOURCES  
INCORPORATED**

Sample ID: FRP-083111-004  
SAMPLE

Lab Sample ID: TK57D  
 LIMS ID: 11-18917  
 Matrix: Water  
 Data Release Authorized: *[Signature]*  
 Reported: 09/06/11

QC Report No: TK57-Geomatrix, Inc.  
 Project: FRP 2011 Shoreline Investigation  
 8769  
 Date Sampled: 08/31/11  
 Date Received: 08/31/11

Instrument/Analyst: NT3/PKC  
 Date Analyzed: 09/01/11 22:13

Sample Amount: 10.0 mL  
 Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	< 0.5 U
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	< 0.2 U
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloropropane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 U
108-88-3	Toluene	0.06	0.2	< 0.2 U
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	< 0.4 U
95-47-6	o-Xylene	0.06	0.2	< 0.2 U
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

*[Signature]*

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: FRP-083111-004

SAMPLE

Lab Sample ID: TK57D

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18917

Project: FRP 2011 Shoreline Investigation

Matrix: Water

8769

Date Analyzed: 09/01/11 22:13

CAS Number	Analyte	MDL	RL	Result
96-18-4	1,2,3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1,4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	1,2,4-Trimethylbenzene	0.06	0.2	< 0.2 U
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromochloromethane	0.07	0.2	< 0.2 U
594-20-7	2,2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1,3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1,2,4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1,2,3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	97.5%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	104%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

## ORGANICS ANALYSIS DATA SHEET

Volatile by Purge &amp; Trap GC/MS-Method SW8260C

Page 1 of 2



Sample ID: FRP-083111-005

SAMPLE

Lab Sample ID: TK57E

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18918

Project: FRP 2011 Shoreline Investigation  
8769

Matrix: Water

Date Sampled: 08/31/11

Data Release Authorized:

Date Received: 08/31/11

Reported: 09/06/11

Instrument/Analyst: NT3/PKC

Sample Amount: 10.0 mL

Date Analyzed: 09/01/11 22:40

Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	< 0.5 U
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	< 0.2 U
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloropropane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 U
108-88-3	Toluene	0.06	0.2	0.5 U
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoro	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	0.8 U
95-47-6	o-Xylene	0.06	0.2	0.4 U
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

3/2012

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: FRP-083111-005  
SAMPLE

Lab Sample ID: TK57E  
LIMS ID: 11-18918  
Matrix: Water  
Date Analyzed: 09/01/11 22:40

QC Report No: TK57-Geomatrix, Inc.  
Project: FRP 2011 Shoreline Investigation  
8769

CAS Number	Analyte	MDL	RL	Result
96-18-4	1, 2, 3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1, 4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1, 3, 5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	<b>1, 2, 4-Trimethylbenzene</b>	<b>0.06</b>	<b>0.2</b>	<b>0.6 J</b>
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromochloromethane	0.07	0.2	< 0.2 U
594-20-7	2, 2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1, 3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1, 2, 4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1, 2, 3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in  $\mu\text{g/L}$  (ppb)

Volatile Surrogate Recovery

d4-1, 2-Dichloroethane	98.9%
d8-Toluene	97.2%
Bromofluorobenzene	102%
d4-1, 2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 1 of 2

Sample ID: FRP-083111-006  
SAMPLE

Lab Sample ID: TK57F

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18919

Project: FRP 2011 Shoreline Investigation  
8769

Matrix: Water

Date Sampled: 08/31/11

Data Release Authorized:

Date Received: 08/31/11

Reported: 09/06/11

Instrument/Analyst: NT3/PKC

Sample Amount: 10.0 mL

Date Analyzed: 09/01/11 23:07

Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	1.3 E
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	2.4
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloroproppane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 U R
108-88-3	Toluene	0.06	0.2	0.7
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoro	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	0.6
95-47-6	o-Xylene	0.06	0.2	0.3
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: FRP-083111-006  
SAMPLE

Lab Sample ID: TK57F

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18919

Project: FRP 2011 Shoreline Investigation  
8769

Matrix: Water

Date Analyzed: 09/01/11 23:07

CAS Number	Analyte	MDL	RL	Result
96-18-4	1,2,3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1,4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	1,2,4-Trimethylbenzene	0.06	0.2	0.3
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromochloromethane	0.07	0.2	< 0.2 U
594-20-7	2,2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1,3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1,2,4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1,2,3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.9%
d8-Toluene	97.8%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	103%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Page 1 of 2

Sample ID: Trip Blanks  
SAMPLE

Lab Sample ID: TK57G

LIMS ID: 11-18920

Matrix: Water

Data Release Authorized:

Reported: 09/06/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation  
8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Instrument/Analyst: NT3/PKC

Date Analyzed: 09/01/11 19:05

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	0.6 BV
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	< 0.2 U
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloropropane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 UR
108-88-3	Toluene	0.06	0.2	< 0.2 U
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoro	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	< 0.4 U
95-47-6	o-Xylene	0.06	0.2	< 0.2 U
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: Trip Blanks  
SAMPLE

Lab Sample ID: TK57G

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18920

Project: FRP 2011 Shoreline Investigation

Matrix: Water

8769

Date Analyzed: 09/01/11 19:05

CAS Number	Analyte	MDL	RL	Result
96-18-4	1,2,3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1,4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	1,2,4-Trimethylbenzene	0.06	0.2	< 0.2 U
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromochloromethane	0.07	0.2	< 0.2 U
594-20-7	2,2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1,3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1,2,4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1,2,3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in  $\mu\text{g/L}$  (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.7%
d8-Toluene	96.8%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	101%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

## VOA SURROGATE RECOVERY SUMMARY

**ANALYTICAL  
RESOURCES  
INCORPORATED**

Matrix: Water

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation  
8769

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT	OUT
MB-090111	Method Blank	10	99.9%	97.3%	103%	101%	0	
LCS-090111	Lab Control	10	102%	98.8%	102%	100%	0	
LCSD-090111	Lab Control Dup	10	102%	98.7%	102%	99.2%	0	
TK57A	FRP-083111-001	10	102%	98.1%	105%	102%	0	
TK57B	FRP-083111-002	10	102%	98.5%	101%	102%	0	
TK57C	FRP-083111-003	10	100%	98.5%	101%	101%	0	
TK57D	FRP-083111-004	10	106%	97.5%	103%	104%	0	
TK57E	FRP-083111-005	10	98.9%	97.2%	102%	102%	0	
TK57F	FRP-083111-006	10	99.9%	97.8%	101%	103%	0	
TK57G	Trip Blanks	10	99.7%	96.8%	103%	101%	0	

**LCS/MB LIMITS****SW8260C**

(DCE) = d4-1,2-Dichloroethane

80-120

80-120

(TOL) = d8-Toluene

80-120

80-120

(BFB) = Bromofluorobenzene

80-120

80-120

(DCB) = d4-1,2-Dichlorobenzene

80-120

80-120

**QC LIMITS**

Prep Method: SW5030B  
 Log Number Range: 11-18914 to 11-18920

## ORGANICS ANALYSIS DATA SHEET

Volatile by Purge & Trap GC/MS-Method SW8260C  
Page 1 of 2
**ANALYTICAL  
RESOURCES  
INCORPORATED**


Sample ID: LCS-090111

LAB CONTROL SAMPLE

Lab Sample ID: LCS-090111

LIMS ID: 11-18914

Matrix: Water

Data Release Authorized: 

Reported: 09/06/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation  
8769

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT3/PKC

LCSD: NT3/PKC

Date Analyzed LCS: 09/01/11 17:40

LCSD: 09/01/11 18:06

Sample Amount LCS: 10.0 mL

LCSD: 10.0 mL

Purge Volume LCS: 10.0 mL

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	10.1	10.0	101%	9.6	10.0	96.0%	5.1%
Bromomethane	10.4	10.0	104%	10.2	10.0	102%	1.9%
Vinyl Chloride	9.9	10.0	99.0%	9.6	10.0	96.0%	3.1%
Chloroethane	9.7	10.0	97.0%	9.5	10.0	95.0%	2.1%
Methylene Chloride	10.6 B	10.0	106%	10.3 B	10.0	103%	2.9%
Acetone	52.0	50.0	104%	46.9	50.0	93.8%	10.3%
Carbon Disulfide	10.0	10.0	100%	9.9	10.0	99.0%	1.0%
1,1-Dichloroethene	10.1	10.0	101%	9.8	10.0	98.0%	3.0%
1,1-Dichloroethane	10.2	10.0	102%	9.8	10.0	98.0%	4.0%
trans-1,2-Dichloroethene	10.0	10.0	100%	9.7	10.0	97.0%	3.0%
cis-1,2-Dichloroethene	9.8	10.0	98.0%	9.8	10.0	98.0%	0.0%
Chloroform	10.2	10.0	102%	10.0	10.0	100%	2.0%
1,2-Dichloroethane	9.9	10.0	99.0%	9.4	10.0	94.0%	5.2%
2-Butanone	51.3	50.0	103%	46.1	50.0	92.2%	10.7%
1,1,1-Trichloroethane	10.3	10.0	103%	10.1	10.0	101%	2.0%
Carbon Tetrachloride	10.3	10.0	103%	10.5	10.0	105%	1.9%
Vinyl Acetate	10.1	10.0	101%	9.7	10.0	97.0%	4.0%
Bromodichloromethane	9.8	10.0	98.0%	9.7	10.0	97.0%	1.0%
1,2-Dichloropropane	10.0	10.0	100%	9.5	10.0	95.0%	5.1%
cis-1,3-Dichloropropene	10.5	10.0	105%	9.7	10.0	97.0%	7.9%
Trichloroethene	9.8	10.0	98.0%	9.7	10.0	97.0%	1.0%
Dibromochloromethane	10.4	10.0	104%	10.4	10.0	104%	0.0%
1,1,2-Trichloroethane	10.0	10.0	100%	9.4	10.0	94.0%	6.2%
Benzene	10.0	10.0	100%	9.9	10.0	99.0%	1.0%
trans-1,3-Dichloropropene	10.2	10.0	102%	9.8	10.0	98.0%	4.0%
2-Chloroethylvinylether	9.7	10.0	97.0%	9.2	10.0	92.0%	5.3%
Bromoform	10.0	10.0	100%	9.8	10.0	98.0%	2.0%
4-Methyl-2-Pentanone (MIBK)	51.1	50.0	102%	49.2	50.0	98.4%	3.8%
2-Hexanone	51.0	50.0	102%	48.8	50.0	97.6%	4.4%
Tetrachloroethene	10.0	10.0	100%	9.6	10.0	96.0%	4.1%
1,1,2,2-Tetrachloroethane	10.0	10.0	100%	9.4	10.0	94.0%	6.2%
Toluene	10.0	10.0	100%	9.7	10.0	97.0%	3.0%
Chlorobenzene	10.1	10.0	101%	9.9	10.0	99.0%	2.0%
Ethylbenzene	10.2	10.0	102%	10.0	10.0	100%	2.0%
Styrene	10.5	10.0	105%	10.3	10.0	103%	1.9%
Trichlorofluoromethane	10.0	10.0	100%	10.1	10.0	101%	1.0%
1,1,2-Trichloro-1,2,2-trifluoroethane	10.0	10.0	100%	9.8	10.0	98.0%	2.0%
m,p-Xylene	20.8	20.0	104%	20.4	20.0	102%	1.9%
c-Xylene	10.3	10.0	103%	10.1	10.0	101%	2.0%
1,2-Dichlorobenzene	10.0	10.0	100%	9.7	10.0	97.0%	3.0%
1,3-Dichlorobenzene	10.0	10.0	100%	9.6	10.0	96.0%	4.1%
1,4-Dichlorobenzene	9.9	10.0	99.0%	9.6	10.0	96.0%	3.1%
Acrolein	48.0	50.0	96.0%	46.0	50.0	92.0%	4.3%
Methyl Iodide	10.3	10.0	103%	10.1	10.0	101%	2.0%
Bromoethane	10.3	10.0	103%	10.0	10.0	100%	3.0%

**ORGANICS ANALYSIS DATA SHEET**

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: LCS-090111

LAB CONTROL SAMPLE

Lab Sample ID: LCS-090111  
LIMS ID: 11-18914  
Matrix: Water

QC Report No: TK57-Geomatrix, Inc.  
Project: FRP 2011 Shoreline Investigation  
8769

Analyte	LCS	Spike	LCS	Spike	LCSD		
		Added-LCS	Recovery	LCSD	Added-LCSD	Recovery	RPD
Acrylonitrile	10.9	10.0	109%	9.3	10.0	93.0%	15.8%
1,1-Dichloropropene	10.1	10.0	101%	10.2	10.0	102%	1.0%
Dibromomethane	9.8	10.0	98.0%	9.8	10.0	98.0%	0.0%
1,1,1,2-Tetrachloroethane	10.4	10.0	104%	10.3	10.0	103%	1.0%
1,2-Dibromo-3-chloropropane	10.1	10.0	101%	9.8	10.0	98.0%	3.0%
1,2,3-Trichloropropane	10.0	10.0	100%	9.6	10.0	96.0%	4.1%
trans-1,4-Dichloro-2-butene	10.1	10.0	101%	10.1	10.0	101%	0.0%
1,3,5-Trimethylbenzene	10.4	10.0	104%	10.1	10.0	101%	2.9%
1,2,4-Trimethylbenzene	10.4	10.0	104%	10.0	10.0	100%	3.9%
Hexachlorobutadiene	10.8	10.0	108%	10.3	10.0	103%	4.7%
Ethylene Dibromide	10.3	10.0	103%	10.0	10.0	100%	3.0%
Bromochloromethane	10.4	10.0	104%	9.8	10.0	98.0%	5.9%
2,2-Dichloropropane	10.3	10.0	103%	10.2	10.0	102%	1.0%
1,3-Dichloropropane	10.2	10.0	102%	9.5	10.0	95.0%	7.1%
Isopropylbenzene	10.3	10.0	103%	9.8	10.0	98.0%	5.0%
n-Propylbenzene	10.4	10.0	104%	10.1	10.0	101%	2.9%
Bromobenzene	10.1	10.0	101%	9.7	10.0	97.0%	4.0%
2-Chlorotoluene	10.1	10.0	101%	9.7	10.0	97.0%	4.0%
4-Chlorotoluene	10.1	10.0	101%	9.9	10.0	99.0%	2.0%
tert-Butylbenzene	10.4	10.0	104%	9.9	10.0	99.0%	4.9%
sec-Butylbenzene	10.4	10.0	104%	10.1	10.0	101%	2.9%
4-Isopropyltoluene	10.4	10.0	104%	10.0	10.0	100%	3.9%
n-Butylbenzene	10.6	10.0	106%	10.2	10.0	102%	3.8%
1,2,4-Trichlorobenzene	10.6	10.0	106%	10.2	10.0	102%	3.8%
Naphthalene	10.6	10.0	106%	10.1	10.0	101%	4.8%
1,2,3-Trichlorobenzene	10.5	10.0	105%	9.9	10.0	99.0%	5.9%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

**Volatile Surrogate Recovery**

	LCS	LCSD
d4-1,2-Dichloroethane	102%	102%
d8-Toluene	98.8%	98.7%
Bromofluorobenzene	102%	102%
d4-1,2-Dichlorobenzene	100%	99.2%

4A  
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

	MB0901
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Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGA

Lab File ID: MB0901

Lab Sample ID: MB0901

Date Analyzed: 09/01/11

Time Analyzed: 1833

Instrument ID: NT3

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01 LCS0901	LCS0901	LCS0901	1740
02 LCS0901	LCS0901	LCS0901A	1806
03 TRIP BLANKS	TK57G	TK57G	1905
04 TRIP BLANK	TK51L	TK51L	1932
05 FRP-083111-0	TK57A	TK57A	2053
06 FRP-083111-0	TK57B	TK57B	2120
07 FRP-083111-0	TK57C	TK57C	2147
08 FRP-083111-0	TK57D	TK57D	2213
09 FRP-083111-0	TK57E	TK57E	2240
10 FRP-083111-0	TK57F	TK57F	2307
11 FRP-083011-0	TK51K	TK51K	2333
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COMMENTS:

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## ORGANICS ANALYSIS DATA SHEET

Volatile by Purge & Trap GC/MS-Method SW8260C  
Page 1 of 2
**ANALYTICAL  
RESOURCES  
INCORPORATED**


Sample ID: MB-090111

METHOD BLANK

Lab Sample ID: MB-090111

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18914

Project: FRP 2011 Shoreline Investigation

Matrix: Water

8769

Data Release Authorized: 

Date Sampled: NA

Reported: 09/06/11

Date Received: NA

Instrument/Analyst: NT3/PKC

Sample Amount: 10.0 mL

Date Analyzed: 09/01/11 18:33

Purge Volume: 10.0 mL

CAS Number	Analyte	MDL	RL	Result
74-87-3	Chloromethane	0.10	0.5	< 0.5 U
74-83-9	Bromomethane	0.04	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.08	0.2	< 0.2 U
75-00-3	Chloroethane	0.15	0.2	< 0.2 U
75-09-2	Methylene Chloride	0.39	0.5	0.4 J
67-64-1	Acetone	0.72	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.09	0.2	< 0.2 U
75-35-4	1,1-Dichloroethene	0.09	0.2	< 0.2 U
75-34-3	1,1-Dichloroethane	0.05	0.2	< 0.2 U
156-60-5	trans-1,2-Dichloroethene	0.08	0.2	< 0.2 U
156-59-2	cis-1,2-Dichloroethene	0.10	0.2	< 0.2 U
67-66-3	Chloroform	0.08	0.2	< 0.2 U
107-06-2	1,2-Dichloroethane	0.08	0.2	< 0.2 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.09	0.2	< 0.2 U
56-23-5	Carbon Tetrachloride	0.08	0.2	< 0.2 U
108-05-4	Vinyl Acetate	0.07	1.0	< 1.0 U
75-27-4	Bromodichloromethane	0.05	0.2	< 0.2 U
78-87-5	1,2-Dichloropropane	0.09	0.2	< 0.2 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.2	< 0.2 U
79-01-6	Trichloroethene	0.08	0.2	< 0.2 U
124-48-1	Dibromochloromethane	0.09	0.2	< 0.2 U
79-00-5	1,1,2-Trichloroethane	0.04	0.2	< 0.2 U
71-43-2	Benzene	0.06	0.2	< 0.2 U
10061-02-6	trans-1,3-Dichloropropene	0.06	0.2	< 0.2 U
110-75-8	2-Chloroethylvinylether	0.09	1.0	< 1.0 U
75-25-2	Bromoform	0.07	0.2	< 0.2 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.38	5.0	< 5.0 U
591-78-6	2-Hexanone	0.31	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.09	0.2	< 0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	0.07	0.2	< 0.2 U
108-88-3	Toluene	0.06	0.2	< 0.2 U
108-90-7	Chlorobenzene	0.04	0.2	< 0.2 U
100-41-4	Ethylbenzene	0.09	0.2	< 0.2 U
100-42-5	Styrene	0.07	0.2	< 0.2 U
75-69-4	Trichlorofluoromethane	0.09	0.2	< 0.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoro	0.11	0.2	< 0.2 U
179601-23-1	m,p-Xylene	0.14	0.4	< 0.4 U
95-47-6	o-Xylene	0.06	0.2	< 0.2 U
95-50-1	1,2-Dichlorobenzene	0.06	0.2	< 0.2 U
541-73-1	1,3-Dichlorobenzene	0.04	0.2	< 0.2 U
106-46-7	1,4-Dichlorobenzene	0.06	0.2	< 0.2 U
107-02-8	Acrolein	0.29	5.0	< 5.0 U
74-88-4	Methyl Iodide	0.04	1.0	< 1.0 U
74-96-4	Bromoethane	0.09	0.2	< 0.2 U
107-13-1	Acrylonitrile	0.18	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.09	0.2	< 0.2 U
74-95-3	Dibromomethane	0.08	0.2	< 0.2 U
630-20-6	1,1,1,2-Tetrachloroethane	0.07	0.2	< 0.2 U
96-12-8	1,2-Dibromo-3-chloropropane	0.21	0.5	< 0.5 U

**ORGANICS ANALYSIS DATA SHEET**

Volatiles by Purge & Trap GC/MS-Method SW8260C  
Page 2 of 2

Sample ID: MB-090111

METHOD BLANK

Lab Sample ID: MB-090111

QC Report No: TK57-Geomatrix, Inc.

LIMS ID: 11-18914

Project: FRP 2011 Shoreline Investigation

Matrix: Water

8769

Date Analyzed: 09/01/11 18:33

CAS Number	Analyte	MDL	RL	Result
96-18-4	1,2,3-Trichloropropane	0.23	0.5	< 0.5 U
110-57-6	trans-1,4-Dichloro-2-butene	0.24	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.06	0.2	< 0.2 U
95-63-6	1,2,4-Trimethylbenzene	0.06	0.2	< 0.2 U
87-68-3	Hexachlorobutadiene	0.11	0.5	< 0.5 U
106-93-4	Ethylene Dibromide	0.08	0.2	< 0.2 U
74-97-5	Bromochloromethane	0.07	0.2	< 0.2 U
594-20-7	2,2-Dichloropropane	0.08	0.2	< 0.2 U
142-28-9	1,3-Dichloropropane	0.02	0.2	< 0.2 U
98-82-8	Isopropylbenzene	0.06	0.2	< 0.2 U
103-65-1	n-Propylbenzene	0.08	0.2	< 0.2 U
108-86-1	Bromobenzene	0.05	0.2	< 0.2 U
95-49-8	2-Chlorotoluene	0.04	0.2	< 0.2 U
106-43-4	4-Chlorotoluene	0.07	0.2	< 0.2 U
98-06-6	tert-Butylbenzene	0.06	0.2	< 0.2 U
135-98-8	sec-Butylbenzene	0.08	0.2	< 0.2 U
99-87-6	4-Isopropyltoluene	0.08	0.2	< 0.2 U
104-51-8	n-Butylbenzene	0.11	0.2	< 0.2 U
120-82-1	1,2,4-Trichlorobenzene	0.10	0.5	< 0.5 U
91-20-3	Naphthalene	0.07	0.5	< 0.5 U
87-61-6	1,2,3-Trichlorobenzene	0.09	0.5	< 0.5 U

Reported in µg/L (ppb)

**Volatile Surrogate Recovery**

d4-1,2-Dichloroethane	99.9%
d8-Toluene	97.3%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	101%

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK  
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: AMEC GEOMATRIX

Lab Code: ARI Case No.: FRP SHORELINE INVESTIGATION SDG No.: TK57

Lab File ID: BFB0901 BFB Injection Date: 09/01/11

Instrument ID: NT3 BFB Injection Time: 1058

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	16.3
75	30.0 - 66.0% of mass 95	48.7
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.2
173	Less than 2.0% of mass 174	0.3 ( 0.4 ) 1
174	50.0 - 101.0% of mass 95	76.7
175	4.0 - 9.0% of mass 174	5.5 ( 7.1 ) 1
176	93.0 - 101.0% of mass 174	74.2 ( 96.7 ) 1
177	5.0 - 9.0% of mass 176	4.9 ( 6.7 ) 2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01 VSTD0.2	VSTD0.2	00_20901	09/01/11	1147
02 VSTD0.5	VSTD0.5	00_50901	09/01/11	1214
03 VSTD01	VSTD01	01_00901	09/01/11	1241
04 VSTD02	VSTD02	02_00901	09/01/11	1308
05 VSTD10	VSTD10	10_00901	09/01/11	1334
06 VSTD20	VSTD20	20_00901	09/01/11	1402
07 VSTD40	VSTD40	40_00901	09/01/11	1428
08 VSTD80	VSTD80	80_00901	09/01/11	1455
09 ICV10	ICV10	ICV0901	09/01/11	1548
10				
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5A  
 VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK  
 BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: AMEC GEOMATRIX

Lab Code: ARI Case No.: FRP SHORELINE INVESTIGATION SDG No.: TK57

Lab File ID: BFB0901X BFB Injection Date: 09/01/11

Instrument ID: NT3 BFB Injection Time: 1636

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	15.1
75	30.0 - 66.0% of mass 95	46.0
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	5.9
173	Less than 2.0% of mass 174	0.4 ( 0.5)1
174	50.0 - 101.0% of mass 95	82.7
175	4.0 - 9.0% of mass 174	6.9 ( 8.4)1
176	93.0 - 101.0% of mass 174	79.7 ( 96.3)1
177	5.0 - 9.0% of mass 176	5.4 ( 6.8)2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01 CC0901	CC0901	CC0901	09/01/11	1712
02 LCS0901	LCS0901	LCS0901	09/01/11	1740
03 LCS0901	LCS0901	LCS0901A	09/01/11	1806
04 MB0901	MB0901	MB0901	09/01/11	1833
05 TRIP BLANKS	TK57G	TK57G	09/01/11	1905
06 TRIP BLANK	TK51L	TK51L	09/01/11	1932
07 FRP-083111-001	TK57A	TK57A	09/01/11	2053
08 FRP-083111-002	TK57B	TK57B	09/01/11	2120
09 FRP-083111-003	TK57C	TK57C	09/01/11	2147
10 FRP-083111-004	TK57D	TK57D	09/01/11	2213
11 FRP-083111-005	TK57E	TK57E	09/01/11	2240
12 FRP-083111-006	TK57F	TK57F	09/01/11	2307
13 FRP-083011-031	TK51K	TK51K	09/01/11	2333
14				
15				
16				
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20				
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22				

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

LAB FILE ID: RF0.2: 00\_20901 RF0.5: 00\_50901 RF1: 01\_00901  
 RF2: 02\_00901 RF10: 10\_00901

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
Chloromethane	0.531	0.556	0.498	0.490	0.489
Vinyl Chloride	0.652	0.660	0.641	0.595	0.596
Bromomethane		0.375	0.409	0.351	0.381
Chloroethane	0.444	0.412	0.401	0.368	0.370
Trichlorofluoromethane	0.870	0.860	0.849	0.829	0.828
Acrolein		0.025	0.028	0.025	0.026
112Trichloro122Trifluoroetha	0.745	0.629	0.583	0.568	0.573
Acetone		0.042	0.039	0.035	0.037
1,1-Dichloroethene	0.553	0.517	0.524	0.474	0.486
Bromoethane	0.406	0.461	0.396	0.400	0.423
Iodomethane		0.902	0.907	0.823	0.870
Methylene Chloride		0.882	0.683	0.546	0.478
Acrylonitrile			0.030	0.050	0.048
Carbon Disulfide	2.027	1.704	1.684	1.574	1.647
Trans-1,2-Dichloroethene	0.640	0.576	0.566	0.546	0.553
Vinyl Acetate			0.281	0.259	0.282
1,1-Dichloroethane	0.940	0.837	0.872	0.823	0.846
2-Butanone		0.051	0.059	0.052	0.055
2,2-Dichloropropane	0.900	0.794	0.826	0.754	0.760
Cis-1,2-Dichloroethene	0.614	0.563	0.543	0.530	0.531
Chloroform	0.814	0.900	0.873	0.843	0.860
Bromochloromethane	0.194	0.191	0.207	0.190	0.208
1,1,1-Trichloroethane	0.977	0.932	0.909	0.856	0.912
1,1-Dichloropropene	0.480	0.475	0.450	0.422	0.451
Carbon Tetrachloride	0.497	0.497	0.462	0.445	0.486
1,2-Dichloroethane	0.276	0.280	0.282	0.265	0.256
Benzene	1.241	1.298	1.268	1.244	1.249
Trichloroethene	0.420	0.372	0.378	0.370	0.367
1,2-Dichloropropane	0.225	0.274	0.249	0.244	0.251
Bromodichloromethane	0.333	0.316	0.333	0.310	0.317
Dibromomethane	0.101	0.116	0.112	0.116	0.105
2-Chloroethyl Vinyl Ether		0.076	0.079	0.068	0.082
4-Methyl-2-Pentanone		0.094	0.090	0.095	0.099
Cis 1,3-dichloropropene	0.348	0.355	0.359	0.338	0.362
Toluene	0.935	0.850	0.873	0.870	0.844
Trans 1,3-Dichloropropene	0.277	0.304	0.269	0.271	0.289
2-Hexanone		0.058	0.064	0.066	0.067

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

LAB FILE ID: RF0.2: 00\_20901 RF0.5: 00\_50901 RF1: 01\_00901  
RF2: 02\_00901 RF10: 10\_00901

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
1,1,2-Trichloroethane	0.153	0.160	0.163	0.168	0.161
1,3-Dichloropropane	0.278	0.260	0.291	0.280	0.283
Tetrachloroethene	0.466	0.416	0.422	0.398	0.398
Chlorodibromomethane	0.174	0.188	0.192	0.188	0.205
1,2-Dibromoethane	0.134	0.157	0.152	0.152	0.162
Chlorobenzene	1.013	1.012	1.035	1.002	0.984
Ethyl Benzene	1.976	1.852	1.847	1.803	1.820
1,1,1,2-Tetrachloroethane	0.283	0.327	0.316	0.307	0.315
m,p-xylene	0.781	0.742	0.704	0.716	0.727
o-Xylene	0.725	0.681	0.728	0.707	0.716
Styrene	1.071	0.954	1.053	1.028	1.080
Bromoform	0.172	0.149	0.156	0.161	0.169
1,1,2,2-Tetrachloroethane	0.292	0.316	0.349	0.313	0.309
1,2,3-Trichloropropane		0.103	0.103	0.108	0.096
Trans-1,4-Dichloro 2-Butene			0.082	0.074	0.076
N-Propyl Benzene	4.033	3.815	3.775	3.775	3.693
Bromobenzene	0.622	0.714	0.702	0.660	0.670
Isopropyl Benzene	3.644	3.370	3.421	3.240	3.226
2-Chloro Toluene	2.361	2.429	2.335	2.289	2.303
4-Chloro Toluene	2.378	2.364	2.370	2.287	2.284
T-Butyl Benzene	2.674	2.679	2.543	2.534	2.536
1,3,5-Trimethyl Benzene	2.939	2.931	2.863	2.861	2.862
1,2,4-Trimethylbenzene	3.083	3.024	2.922	2.872	2.905
S-Butyl Benzene	3.988	3.888	3.750	3.756	3.652
4-Isopropyl Toluene	3.593	3.238	3.210	3.209	3.160
1,3-Dichlorobenzene	1.715	1.599	1.551	1.541	1.525
1,4-Dichlorobenzene	1.654	1.631	1.556	1.504	1.494
N-Butyl Benzene	2.998	2.865	2.818	2.743	2.737
1,2-Dichlorobenzene	1.335	1.374	1.330	1.326	1.293
1,2-Dibromo 3-Chloropropane		0.057	0.053	0.053	0.050
1,2,4-Trichlorobenzene		0.872	0.839	0.855	0.867
Hexachloro 1,3-Butadiene		0.488	0.508	0.458	0.416
Naphthalene		0.977	1.064	1.052	1.157
1,2,3-Trichlorobenzene		0.641	0.618	0.640	0.648
Dichlorodifluoromethane	0.589	0.606	0.551	0.516	0.540
Methyl tert butyl ether	0.748	0.932	1.000	0.903	0.946

FORM VI VOA

TK57:00045

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

LAB FILE ID: RF0.2: 00\_20901 RF0.5: 00\_50901 RF1: 01\_00901  
 RF2: 02\_00901 RF10: 10\_00901

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
d4-1,2-Dichloroethane	0.336	0.366	0.360	0.365	0.365
d8-Toluene	1.309	1.268	1.258	1.255	1.269
4-Bromofluorobenzene	0.484	0.504	0.507	0.515	0.508
d4-1,2-Dichlorobenzene	0.822	0.865	0.848	0.851	0.846
Dibromofluoromethane	0.418	0.444	0.432	0.439	0.439

FORM VI VOA

TK57: 00046

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

LAB FILE ID: RF20: 20\_00901    RF40: 40\_00901    RF80: 80\_00901

COMPOUND	RF20	RF40	RF80
Chloromethane	0.498	0.520	0.483
Vinyl Chloride	0.605	0.635	0.610
Bromomethane	0.368	0.389	0.357
Chloroethane	0.381	0.404	0.353
Trichlorofluoromethane	0.850	0.881	0.822
Acrolein	0.027	0.029	0.028
112Trichloro122Trifluoroetha	0.585	0.616	0.567
Acetone	0.039	0.041	0.040
1,1-Dichloroethene	0.491	0.526	0.488
Bromoethane	0.424	0.443	0.412
Iodomethane	0.891	0.913	0.852
Methylene Chloride	0.470	0.487	0.456
Acrylonitrile	0.052	0.056	0.054
Carbon Disulfide	1.670	1.746	1.596
Trans-1,2-Dichloroethene	0.566	0.591	0.558
Vinyl Acetate	0.296	0.317	0.332
1,1-Dichloroethane	0.854	0.895	0.846
2-Butanone	0.056	0.059	0.059
2,2-Dichloropropane	0.756	0.800	0.707
Cis-1,2-Dichloroethene	0.544	0.570	0.539
Chloroform	0.874	0.905	0.866
Bromochloromethane	0.202	0.210	0.203
1,1,1-Trichloroethane	0.906	0.968	0.895
1,1-Dichloropropene	0.452	0.470	0.443
Carbon Tetrachloride	0.488	0.518	0.482
1,2-Dichloroethane	0.256	0.267	0.252
Benzene	1.231	1.282	1.158
Trichloroethene	0.360	0.374	0.350
1,2-Dichloropropane	0.247	0.260	0.249
Bromodichloromethane	0.324	0.346	0.333
Dibromomethane	0.109	0.114	0.108
2-Chloroethyl Vinyl Ether	0.084	0.086	0.086
4-Methyl-2-Pentanone	0.096	0.101	0.095
Cis 1,3-dichloropropene	0.368	0.396	0.378
Toluene	0.854	0.884	0.810
Trans 1,3-Dichloropropene	0.297	0.317	0.302
2-Hexanone	0.067	0.068	0.066

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

LAB FILE ID: RF20: 20\_00901    RF40: 40\_00901    RF80: 80\_00901

COMPOUND	RF20	RF40	RF80
1,1,2-Trichloroethane	0.162	0.169	0.160
1,3-Dichloropropane	0.273	0.288	0.279
Tetrachloroethylene	0.390	0.405	0.386
Chlorodibromomethane	0.208	0.223	0.222
1,2-Dibromoethane	0.162	0.169	0.162
Chlorobenzene	0.978	0.997	0.920
Ethyl Benzene	1.793	1.796	1.545
1,1,1,2-Tetrachloroethane	0.318	0.338	0.330
m,p-xylene	0.720	0.729	0.648
o-Xylene	0.705	0.742	0.703
Styrene	1.075	1.116	1.043
Bromoform	0.178	0.193	0.195
1,1,2,2-Tetrachloroethane	0.313	0.322	0.314
1,2,3-Trichloropropane	0.099	0.103	0.100
Trans-1,4-Dichloro 2-Butene	0.079	0.081	0.084
N-Propyl Benzene	3.617	3.527	2.893
Bromobenzene	0.656	0.679	0.655
Isopropyl Benzene	3.189	3.150	2.675
2-Chloro Toluene	2.252	2.240	2.056
4-Chloro Toluene	2.268	2.284	2.054
T-Butyl Benzene	2.503	2.540	2.236
1,3,5-Trimethyl Benzene	2.864	2.850	2.439
1,2,4-Trimethylbenzene	2.897	2.903	2.457
S-Butyl Benzene	3.612	3.555	2.890
4-Isopropyl Toluene	3.150	3.109	2.591
1,3-Dichlorobenzene	1.502	1.539	1.435
1,4-Dichlorobenzene	1.476	1.506	1.402
N-Butyl Benzene	2.767	2.770	2.359
1,2-Dichlorobenzene	1.280	1.300	1.225
1,2-Dibromo 3-Chloropropane	0.051	0.055	0.055
1,2,4-Trichlorobenzene	0.894	0.906	0.881
Hexachloro 1,3-Butadiene	0.446	0.452	0.442
Naphthalene	1.217	1.228	1.184
1,2,3-Trichlorobenzene	0.662	0.666	0.645
Dichlorodifluoromethane	0.550	0.574	0.524
Methyl tert butyl ether	0.955	0.993	0.932

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

LAB FILE ID: RF20: 20\_00901    RF40: 40\_00901    RF80: 80\_00901

COMPOUND	RF20	RF40	RF80
d4-1,2-Dichloroethane	0.360	0.363	0.377
d8-Toluene	1.263	1.294	1.269
4-Bromofluorobenzene	0.516	0.509	0.518
d4-1,2-Dichlorobenzene	0.832	0.836	0.827
Dibromofluoromethane	0.455	0.451	0.459

FORM VI VOA

TK57 : 00049

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R <sup>2</sup>
Chloromethane	AVRG	0.508	5.0
Vinyl Chloride	AVRG	0.624	4.2
Bromomethane	AVRG	0.376	5.2
Chloroethane	AVRG	0.392	7.5
Trichlorofluoromethane	AVRG	0.849	2.5
Acrolein	AVRG	0.027	5.5
112Trichloro122Trifluoroetha	AVRG	0.608	9.8
Acetone	AVRG	0.039	6.5
1,1-Dichloroethene	AVRG	0.508	5.2
Bromoethane	AVRG	0.421	5.3
Iodomethane	AVRG	0.880	3.8
Methylene Chloride	LINR		0.9987
Acrylonitrile	AVRG	0.048	19.6
Carbon Disulfide	AVRG	1.706	8.3
Trans-1,2-Dichloroethene	AVRG	0.575	5.2
Vinyl Acetate	AVRG	0.294	9.0
1,1-Dichloroethane	AVRG	0.864	4.3
2-Butanone	AVRG	0.056	6.1
2,2-Dichloropropane	AVRG	0.787	7.4
Cis-1,2-Dichloroethene	AVRG	0.554	5.1
Chloroform	AVRG	0.867	3.4
Bromochloromethane	AVRG	0.200	4.0
1,1,1-Trichloroethane	AVRG	0.919	4.3
1,1-Dichloropropene	AVRG	0.455	4.2
Carbon Tetrachloride	AVRG	0.484	4.6
1,2-Dichloroethane	AVRG	0.267	4.3
Benzene	AVRG	1.246	3.4
Trichloroethene	AVRG	0.374	5.6
1,2-Dichloropropane	AVRG	0.250	5.6
Bromodichloromethane	AVRG	0.326	3.6
Dibromomethane	AVRG	0.110	4.9
2-Chloroethyl Vinyl Ether	AVRG	0.080	8.1
4-Methyl-2-Pentanone	AVRG	0.096	3.5
Cis 1,3-dichloropropene	AVRG	0.363	5.0
Toluene	AVRG	0.865	4.2
Trans 1,3-Dichloropropene	AVRG	0.291	5.9
2-Hexanone	AVRG	0.065	5.3

<- Indicates value outside QC limits:  
(%RSD < 20% or R<sup>2</sup> > 0.990)

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
1,1,2-Trichloroethane	AVRG	0.162	3.1
1,3-Dichloropropane	AVRG	0.279	3.4
Tetrachloroethene	AVRG	0.410	6.2
Chlorodibromomethane	AVRG	0.200	8.7
1,2-Dibromoethane	AVRG	0.156	6.8
Chlorobenzene	AVRG	0.993	3.5
Ethyl Benzene	AVRG	1.804	6.7
1,1,1,2-Tetrachloroethane	AVRG	0.317	5.3
m,p-xylene	AVRG	0.721	5.2
o-Xylene	AVRG	0.713	2.6
Styrene	AVRG	1.053	4.6
Bromoform	AVRG	0.172	9.6
1,1,2,2-Tetrachloroethane	AVRG	0.316	5.0
1,2,3-Trichloropropane	AVRG	0.102	3.6
Trans-1,4-Dichloro 2-Butene	AVRG	0.080	4.6
N-Propyl Benzene	AVRG	3.641	9.3
Bromobenzene	AVRG	0.670	4.3
Isopropyl Benzene	AVRG	3.239	8.6
2-Chloro Toluene	AVRG	2.283	4.8
4-Chloro Toluene	AVRG	2.286	4.6
T-Butyl Benzene	AVRG	2.531	5.4
1,3,5-Trimethyl Benzene	AVRG	2.826	5.7
1,2,4-Trimethylbenzene	AVRG	2.883	6.5
S-Butyl Benzene	AVRG	3.636	9.2
4-Isopropyl Toluene	AVRG	3.158	8.7
1,3-Dichlorobenzene	AVRG	1.551	5.2
1,4-Dichlorobenzene	AVRG	1.528	5.4
N-Butyl Benzene	AVRG	2.757	6.6
1,2-Dichlorobenzene	AVRG	1.308	3.4
1,2-Dibromo 3-Chloropropane	AVRG	0.053	4.8
1,2,4-Trichlorobenzene	AVRG	0.873	2.6
Hexachloro 1,3-Butadiene	AVRG	0.458	6.7
Naphthalene	AVRG	1.126	8.5
1,2,3-Trichlorobenzene	AVRG	0.646	2.4
Dichlorodifluoromethane	AVRG	0.556	5.6
Methyl tert butyl ether	AVRG	0.926	8.5

<- Indicates value outside QC limits:  
(%RSD < 20% or R^2 > 0.990)

FORM 6  
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Calibration Date: 09/01/11

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R <sup>2</sup>
d4-1,2-Dichloroethane	AVRG	0.362	3.2
d8-Toluene	AVRG	1.273	1.5
4-Bromofluorobenzene	AVRG	0.508	2.1
d4-1,2-Dichlorobenzene	AVRG	0.841	1.7
Dibromofluoromethane	AVRG	0.442	3.0

<- Indicates value outside QC limits:  
(%RSD < 20% or R<sup>2</sup> > 0.990)

7A  
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Cont. Calib. Date: 09/01/11

Init. Calib. Date: 09/01/11

Cont. Calib. Time: 1712

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Chloromethane	0.508	0.500	0.100	AVRG	-1.6
Vinyl Chloride	0.624	0.591	0.010	AVRG	-5.3
Bromomethane	0.376	0.370	0.010	AVRG	-1.6
Chloroethane	0.392	0.371	0.010	AVRG	-5.4
Trichlorofluoromethane	0.849	0.841	0.010	AVRG	-0.9
Acrolein	0.027	0.023	0.010	AVRG	-14.8
112Trichloro122Trifluoroetha	0.608	0.602	0.010	AVRG	-1.0
Acetone	0.039	0.040	0.010	AVRG	2.6
1,1-Dichloroethene	0.507	0.486	0.010	AVRG	-4.1
Bromoethane	0.421	0.422	0.010	AVRG	0.2
Iodomethane	0.880	0.870	0.010	AVRG	-1.1
Methylene Chloride	10.000	10.135	0.010	LINR	1.4
Acrylonitrile	0.048	0.042	0.010	AVRG	-12.5
Carbon Disulfide	1.706	1.681	0.010	AVRG	-1.5
Trans-1,2-Dichloroethene	0.574	0.556	0.010	AVRG	-3.1
Vinyl Acetate	0.294	0.268	0.010	AVRG	-8.8
1,1-Dichloroethane	0.864	0.833	0.100	AVRG	-3.6
2-Butanone	0.056	0.050	0.010	AVRG	-10.7
2,2-Dichloropropane	0.787	0.794	0.010	AVRG	0.9
Cis-1,2-Dichloroethene	0.554	0.531	0.010	AVRG	-4.2
Chloroform	0.867	0.838	0.010	AVRG	-3.3
Bromochloromethane	0.201	0.194	0.010	AVRG	-3.5
1,1,1-Trichloroethane	0.919	0.906	0.010	AVRG	-1.4
1,1-Dichloropropene	0.455	0.457	0.010	AVRG	0.4
Carbon Tetrachloride	0.484	0.490	0.010	AVRG	1.2
1,2-Dichloroethane	0.267	0.243	0.010	AVRG	-9.0
Benzene	1.246	1.237	0.010	AVRG	-0.7
Trichloroethene	0.374	0.358	0.010	AVRG	-4.3
1,2-Dichloropropane	0.250	0.239	0.010	AVRG	-4.4
Bromodichloromethane	0.326	0.306	0.010	AVRG	-6.1
Dibromomethane	0.110	0.101	0.010	AVRG	-8.2
2-Chloroethyl Vinyl Ether	0.080	0.076	0.010	AVRG	-5.0
4-Methyl-2-Pentanone	0.096	0.090	0.010	AVRG	-6.2
Cis 1,3-dichloropropene	0.363	0.354	0.010	AVRG	-2.5
Toluene	0.865	0.873	0.010	AVRG	0.9
Trans 1,3-Dichloropropene	0.291	0.282	0.010	AVRG	-3.1
2-Hexanone	0.065	0.062	0.010	AVRG	-4.6

<- Exceeds QC limit of 20% D

\* RF less than minimum RF

7A  
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Cont. Calib. Date: 09/01/11

Init. Calib. Date: 09/01/11

Cont. Calib. Time: 1712

COMPOUND	Cal Amt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
1,1,2-Trichloroethane	0.162	0.159	0.010	AVRG	-1.8
1,3-Dichloropropane	0.279	0.264	0.010	AVRG	-5.4
Tetrachloroethene	0.410	0.407	0.010	AVRG	-0.7
Chlorodibromomethane	0.200	0.191	0.010	AVRG	-4.5
1,2-Dibromoethane	0.156	0.153	0.010	AVRG	-1.9
Chlorobenzene	0.993	0.982	0.300	AVRG	-1.1
Ethyl Benzene	1.804	1.848	0.010	AVRG	2.4
1,1,1,2-Tetrachloroethane	0.317	0.301	0.010	AVRG	-5.0
m,p-xylene	0.721	0.731	0.010	AVRG	1.4
o-Xylene	0.713	0.722	0.010	AVRG	1.3
Styrene	1.052	1.067	0.010	AVRG	1.4
Bromoform	0.172	0.156	0.100	AVRG	-9.3
1,1,2,2-Tetrachloroethane	0.316	0.298	0.300	AVRG	-5.7
1,2,3-Trichloropropane	0.102	0.095	0.010	AVRG	-6.9
Trans-1,4-Dichloro 2-Butene	0.079	0.065	0.010	AVRG	-17.7
N-Propyl Benzene	3.641	3.857	0.010	AVRG	5.9
Bromobenzene	0.670	0.676	0.010	AVRG	0.9
Isopropyl Benzene	3.239	3.350	0.010	AVRG	3.4
2-Chloro Toluene	2.283	2.313	0.010	AVRG	1.3
4-Chloro Toluene	2.286	2.348	0.010	AVRG	2.7
T-Butyl Benzene	2.531	2.609	0.010	AVRG	3.1
1,3,5-Trimethyl Benzene	2.826	2.981	0.010	AVRG	5.5
1,2,4-Trimethylbenzene	2.883	2.997	0.010	AVRG	4.0
S-Butyl Benzene	3.636	3.842	0.010	AVRG	5.7
4-Isopropyl Toluene	3.158	3.344	0.010	AVRG	5.9
1,3-Dichlorobenzene	1.551	1.536	0.010	AVRG	-1.0
1,4-Dichlorobenzene	1.528	1.500	0.010	AVRG	-1.8
N-Butyl Benzene	2.757	2.969	0.010	AVRG	7.7
1,2-Dichlorobenzene	1.308	1.268	0.010	AVRG	-3.0
1,2-Dibromo 3-Chloropropane	0.053	0.050	0.010	AVRG	-5.7
1,2,4-Trichlorobenzene	0.873	0.868	0.010	AVRG	-0.6
Hexachloro 1,3-Butadiene	0.458	0.496	0.010	AVRG	8.3
Naphthalene	1.126	1.076	0.010	AVRG	-4.4
1,2,3-Trichlorobenzene	0.646	0.631	0.010	AVRG	-2.3
Dichlorodifluoromethane	0.556	0.563	0.010	AVRG	1.2
Methyl tert butyl ether	0.926	0.860	0.010	AVRG	-7.1

<- Exceeds QC limit of 20% D

\* RF less than minimum RF

7A  
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Instrument ID: NT3

Cont. Calib. Date: 09/01/11

Init. Calib. Date: 09/01/11

Cont. Calib. Time: 1712

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
d4-1,2-Dichloroethane	0.362	0.353	0.010	AVRG	-2.5
d8-Toluene	1.273	1.294	0.010	AVRG	1.6
4-Bromofluorobenzene	0.508	0.515	0.010	AVRG	1.4
d4-1,2-Dichlorobenzene	0.841	0.814	0.010	AVRG	-3.2
Dibromofluoromethane	0.442	0.445	0.010	AVRG	0.7

<- Exceeds QC limit of 20% D

\* RF less than minimum RF

8A  
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Ical Midpoint ID: 10\_00901

Ical Date: 09/01/11

Instrument ID: NT3

Project Run Date: 09/01/11

	IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
ICAL MIDPT	220246	5.25	342057	5.64	343287	7.71
UPPER LIMIT	440492	5.75	684114	6.14	686574	8.21
LOWER LIMIT	110123	4.75	171028	5.14	171644	7.21
=====	=====	=====	=====	=====	=====	=====
Sample ID						
=====	=====	=====	=====	=====	=====	=====
01 LCS0901	213058	5.25	338009	5.64	336401	7.71
02 LCS0901	211505	5.26	329586	5.65	326925	7.72
03 MB0901	218581	5.25	331782	5.64	326401	7.71
04 TRIP BLANKS	213968	5.25	328134	5.64	321982	7.71
05 TRIP BLANK	212569	5.25	323088	5.64	319510	7.71
06 FRP-083111-0	206638	5.25	307073	5.64	315278	7.71
07 FRP-083111-0	211831	5.25	328673	5.64	334076	7.71
08 FRP-083111-0	211775	5.25	324032	5.65	329324	7.71
09 FRP-083111-0	214734	5.25	328273	5.64	329592	7.71
10 FRP-083111-0	223430	5.25	332765	5.64	327934	7.71
11 FRP-083111-0	212788	5.25	333782	5.64	326958	7.72
12 FRP-083011-0	217004	5.26	337335	5.65	342143	7.71
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (PFB) = Pentafluorobenzene

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint

AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint

RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint

RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

\* Values outside of QC limits.

8A  
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC

Client: AMEC GEOMATRIX

ARI Job No: TK57

Project: FRP SHORELINE INVESTIGATION

Ical Midpoint ID: 10\_00901

Ical Date: 09/01/11

Instrument ID: NT3

Project Run Date: 09/01/11

	IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
ICAL MIDPT	212149	9.41				
UPPER LIMIT	424298	9.91				
LOWER LIMIT	106074	8.91				
Sample ID						
01 LCS0901	210931	9.41				
02 LCS0901	210382	9.41				
03 MB0901	199673	9.41				
04 TRIP BLANKS	200670	9.41				
05 TRIP BLANK	197902	9.41				
06 FRP-083111-0	199738	9.41				
07 FRP-083111-0	201993	9.41				
08 FRP-083111-0	206016	9.41				
09 FRP-083111-0	203142	9.41				
10 FRP-083111-0	204863	9.41				
11 FRP-083111-0	199427	9.41				
12 FRP-083011-0	204125	9.41				
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint

AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint

RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint

RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

\* Values outside of QC limits.

Metals Analysis  
Report and Summary QC Forms

ARI Job ID: TK57, TK58

**Cover Page****INORGANIC ANALYSIS DATA PACKAGE**

ANALYTICAL  
RESOURCES  
INCORPORATED

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

CLIENT ID	ARI ID	ARI LIMS ID	REPREP
FRP-083111-001	TK57A	11-18914	
FRP-083111-001D	TK57ADUP	11-18914	
FRP-083111-001S	TK57ASPK	11-18914	
FRP-083111-002	TK57B	11-18915	
PBW	TK57MB1	11-18915	
LCSW	TK57MB1SPK	11-18915	
FRP-083111-003	TK57C	11-18916	
FRP-083111-004	TK57D	11-18917	
FRP-083111-005	TK57E	11-18918	
FRP-083111-006	TK57F	11-18919	

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO

Comments: \_\_\_\_\_

THIS DATA PACKAGE HAS BEEN REVIEWED AND AUTHORIZED FOR RELEASE BY:

Signature:  Name: Jay Kuhn  
Date: 9/17/11 Title: Inorganics Director

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: FRP-083111-001

SAMPLE

Lab Sample ID: TK57A

LIMS ID: 11-18914

Matrix: Water

Data Release Authorized:

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
3010A	09/02/11	6010B	09/07/11	7429-90-5	Aluminum	25.7	50	3,050	
200.8	09/02/11	200.8	09/08/11	7440-38-2	Arsenic	0.048	0.2	6.3	
3010A	09/02/11	6010B	09/07/11	7440-43-9	Cadmium	0.18	2	2	U
3010A	09/02/11	6010B	09/07/11	7440-47-3	Chromium	1.24	5	7	
3010A	09/02/11	6010B	09/07/11	7440-50-8	Copper	0.92	2	15	
200.8	09/02/11	200.8	09/08/11	7439-92-1	Lead	0.046	0.1	1.2	
3010A	09/02/11	6010B	09/07/11	7440-02-0	Nickel	3.9	10	10	U
3010A	09/02/11	6010B	09/07/11	7782-49-2	Selenium	5.0	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-28-0	Thallium	3.1	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-62-2	Vanadium	0.27	3	127	
3010A	09/02/11	6010B	09/07/11	7440-66-6	Zinc	1.4	10	10	U

Reported in ug/L (ppb).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

Sample ID: FRP-083111-002

SAMPLE

Lab Sample ID: TK57B

LIMS ID: 11-18915

Matrix: Water

 Data Release Authorized: *[Signature]*

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
3010A	09/02/11	6010B	09/07/11	7429-90-5	Aluminum	25.7	50	3,450	
200.8	09/02/11	200.8	09/08/11	7440-38-2	Arsenic	0.048	0.2	6.1	
3010A	09/02/11	6010B	09/07/11	7440-43-9	Cadmium	0.18	2	2	U
3010A	09/02/11	6010B	09/07/11	7440-47-3	Chromium	1.24	5	8	
3010A	09/02/11	6010B	09/07/11	7440-50-8	Copper	0.92	2	16	
200.8	09/02/11	200.8	09/08/11	7439-92-1	Lead	0.046	0.1	1.2	
3010A	09/02/11	6010B	09/07/11	7440-02-0	Nickel	3.9	10	10	U
3010A	09/02/11	6010B	09/07/11	7782-49-2	Selenium	5.0	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-28-0	Thallium	3.1	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-62-2	Vanadium	0.27	3	128	
3010A	09/02/11	6010B	09/07/11	7440-66-6	Zinc	1.4	10	10	U

Reported in ug/L (ppb).

U-Analyte undetected at given RL

RL=Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: FRP-083111-003

SAMPLE

Lab Sample ID: TK57C

LIMS ID: 11-18916

Matrix: Water

Data Release Authorized

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
3010A	09/02/11	6010B	09/07/11	7429-90-5	Aluminum	25.7	50	10,700	
200.8	09/02/11	200.8	09/08/11	7440-38-2	Arsenic	0.048	0.2	4.1	
3010A	09/02/11	6010B	09/07/11	7440-43-9	Cadmium	0.18	2	2	U
3010A	09/02/11	6010B	09/07/11	7440-47-3	Chromium	1.24	5	28	
3010A	09/02/11	6010B	09/07/11	7440-50-8	Copper	0.92	2	52	
200.8	09/02/11	200.8	09/08/11	7439-92-1	Lead	0.046	0.1	2.9	
3010A	09/02/11	6010B	09/07/11	7440-02-0	Nickel	3.9	10	10	
3010A	09/02/11	6010B	09/07/11	7782-49-2	Selenium	5.0	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-28-0	Thallium	3.1	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-62-2	Vanadium	0.27	3	43	
3010A	09/02/11	6010B	09/07/11	7440-66-6	Zinc	1.4	10	40	

Reported in ug/L (ppb).

U-Analyte undetected at given RL

RL=Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

Sample ID: FRP-083111-004

SAMPLE

Lab Sample ID: TK57D

LIMS ID: 11-18917

Matrix: Water

 Data Release Authorized: *[Signature]*

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
3010A	09/02/11	6010B	09/07/11	7429-90-5	Aluminum	25.7	50	2,830	
200.8	09/02/11	200.8	09/09/11	7440-38-2	Arsenic	0.120	0.5	2.1	
3010A	09/02/11	6010B	09/07/11	7440-43-9	Cadmium	0.18	2	2	U
3010A	09/02/11	6010B	09/07/11	7440-47-3	Chromium	1.24	5	43	
3010A	09/02/11	6010B	09/07/11	7440-50-8	Copper	0.92	2	47	
200.8	09/02/11	200.8	09/08/11	7439-92-1	Lead	0.046	0.1	3.0	
3010A	09/02/11	6010B	09/07/11	7440-02-0	Nickel	3.9	10	10	U
3010A	09/02/11	6010B	09/07/11	7782-49-2	Selenium	5.0	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-28-0	Thallium	3.1	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-62-2	Vanadium	0.27	3	125	
3010A	09/02/11	6010B	09/07/11	7440-66-6	Zinc	1.4	10	20	

Reported in ug/L (ppb).

U-Analyte undetected at given RL

RL=Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

**Sample ID: FRP-083111-005  
SAMPLE**

Lab Sample ID: TK57E

LIMS ID: 11-18918

Matrix: Water

Data Release Authorized:

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
3010A	09/02/11	6010B	09/07/11	7429-90-5	Aluminum	25.7	50	2,190	
200.8	09/02/11	200.8	09/08/11	7440-38-2	Arsenic	0.048	0.2	9.2	
3010A	09/02/11	6010B	09/07/11	7440-43-9	Cadmium	0.18	2	2	U
3010A	09/02/11	6010B	09/07/11	7440-47-3	Chromium	1.24	5	5	U
3010A	09/02/11	6010B	09/07/11	7440-50-8	Copper	0.92	2	4	
200.8	09/02/11	200.8	09/08/11	7439-92-1	Lead	0.046	0.1	0.3	
3010A	09/02/11	6010B	09/07/11	7440-02-0	Nickel	3.9	10	10	U
3010A	09/02/11	6010B	09/07/11	7782-49-2	Selenium	5.0	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-28-0	Thallium	3.1	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-62-2	Vanadium	0.27	3	10	
3010A	09/02/11	6010B	09/07/11	7440-66-6	Zinc	1.4	10	10	U

Reported in ug/L (ppb).

U-Analyte undetected at given RL

RL=Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

**Sample ID: FRP-083111-006**
**SAMPLE**

Lab Sample ID: TK57F

LIMS ID: 11-18919

Matrix: Water

 Data Release Authorized: *[Signature]*

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
3010A	09/02/11	6010B	09/07/11	7429-90-5	Aluminum	25.7	50	50	U
200.8	09/02/11	200.8	09/08/11	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	09/02/11	6010B	09/07/11	7440-43-9	Cadmium	0.18	2	2	U
3010A	09/02/11	6010B	09/07/11	7440-47-3	Chromium	1.24	5	5	U
3010A	09/02/11	6010B	09/07/11	7440-50-8	Copper	0.92	2	2	U
200.8	09/02/11	200.8	09/08/11	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	09/02/11	6010B	09/07/11	7440-02-0	Nickel	3.9	10	10	U
3010A	09/02/11	6010B	09/07/11	7782-49-2	Selenium	5.0	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-28-0	Thallium	3.1	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-62-2	Vanadium	0.27	3	3	U
3010A	09/02/11	6010B	09/07/11	7440-66-6	Zinc	1.4	10	10	U

Reported in ug/L (ppb).

U-Analyte undetected at given RL

RL=Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

Sample ID: FRP-083111-001

**MATRIX SPIKE**

Lab Sample ID: TK57A

LIMS ID: 11-18914

Matrix: Water

Data Release Authorized *[Signature]*

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

**MATRIX SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Aluminum	6010B	3,050	5,060	2,000	100%	
Arsenic	200.8	6.34	31.4	25.0	100%	
Cadmium	6010B	2.00 U	522	500	104%	
Chromium	6010B	7.19	518	500	102%	
Copper	6010B	14.8	546	500	106%	
Lead	200.8	1.25	26.2	25.0	99.8%	
Nickel	6010B	10.0 U	495	500	99.0%	
Selenium	6010B	50.0 U	2,060	2,000	103%	
Thallium	6010B	50.0 U	2,000	2,000	100%	
Vanadium	6010B	127	648	500	104%	
Zinc	6010B	10.0 U	496	500	99.2%	

Reported in  $\mu\text{g/L}$ 

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

NR-Not Recovered

Percent Recovery Limits: 75-125%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: FRP-083111-001  
DUPLICATE

Lab Sample ID: TK57A

LIMS ID: 11-18914

Matrix: Water

Data Release Authorized

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Aluminum	6010B	3,050	3,010	1.3%	+/- 20%	
Arsenic	200.8	6.3	6.3	0.0%	+/- 20%	
Cadmium	6010B	2 U	2 U	0.0%	+/- 2	L
Chromium	6010B	7	8	13.3%	+/- 5	L
Copper	6010B	15	15	0.0%	+/- 20%	
Lead	200.8	1.2	1.2	0.0%	+/- 20%	
Nickel	6010B	10 U	10 U	0.0%	+/- 10	L
Selenium	6010B	50 U	50 U	0.0%	+/- 50	L
Thallium	6010B	50 U	50 U	0.0%	+/- 50	L
Vanadium	6010B	127	126	0.8%	+/- 20%	
Zinc	6010B	10 U	10 U	0.0%	+/- 10	L

Reported in µg/L

\*--Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

**Sample ID: LAB CONTROL**

Lab Sample ID: TK57LCS

LIMS ID: 11-18915

Matrix: Water

Data Release Authorized

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: NA

Date Received: NA

**BLANK SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Aluminum	6010B	2080	2000	104%	
Arsenic	200.8	26.8	25.0	107%	
Cadmium	6010B	513	500	103%	
Chromium	6010B	521	500	104%	
Copper	6010B	495	500	99.0%	
Lead	200.8	27.5	25.0	110%	
Nickel	6010B	500	500	100%	
Selenium	6010B	2010	2000	100%	
Thallium	6010B	2020	2000	101%	
Vanadium	6010B	516	500	103%	
Zinc	6010B	490	500	98.0%	

Reported in µg/L

N-Control limit not met

Control Limits: 80-120%

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

**Sample ID: METHOD BLANK**

Lab Sample ID: TK57MB

LIMS ID: 11-18915

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 09/12/11

QC Report No: TK57-Geomatrix, Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: NA

Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
3010A	09/02/11	6010B	09/07/11	7429-90-5	Aluminum	25.7	50	50	U
200.8	09/02/11	200.8	09/08/11	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	09/02/11	6010B	09/07/11	7440-43-9	Cadmium	0.18	2	2	U
3010A	09/02/11	6010B	09/07/11	7440-47-3	Chromium	1.24	5	5	U
3010A	09/02/11	6010B	09/07/11	7440-50-8	Copper	0.92	2	2	U
200.8	09/02/11	200.8	09/08/11	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	09/02/11	6010B	09/07/11	7440-02-0	Nickel	3.9	10	10	U
3010A	09/02/11	6010B	09/07/11	7782-49-2	Selenium	5.0	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-28-0	Thallium	3.1	50	50	U
3010A	09/02/11	6010B	09/07/11	7440-62-2	Vanadium	0.27	3	3	U
3010A	09/02/11	6010B	09/07/11	7440-66-6	Zinc	1.4	10	10	U

Reported in ug/L (ppb).

U-Analyte undetected at given RL

RL=Reporting Limit

# Calibration Verification

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



UNITS: ug/L

ANALYTE	EL	M	RUN	ICVTV	ICV	%R	CCVTV	CCV1	%R	CCV2	%R	CCV3	%R	CCV4	%R	CCV5	%R
Aluminum	AL	ICP	IP090771	2000.0	2010.80	100.5	2000.0	2015.86	100.8	1994.93	99.7	2000.10	100.0	1978.14	98.9		
Arsenic	AS	PMS	MS090881	50.0	50.26	100.5	50.0	50.26	100.5	49.98	100.0	49.50	99.0	49.32	98.6	49.07	98.4
Cadmium	CD	ICP	IP090771	1000.0	1053.93	105.4	1000.0	1056.53	105.7	1040.58	104.1	1048.44	104.8	1040.12	104.0		
Chromium	CR	ICP	IP090771	1000.0	1026.71	102.7	1000.0	1032.24	103.2	1017.14	101.7	1019.03	101.9	1012.47	101.2		
Copper	CU	ICP	IP090771	1000.0	1029.19	102.9	1000.0	1033.88	103.4	1022.06	102.2	1027.52	102.8	1018.80	101.9		
Lead	PB	PMS	MS090881	50.0	50.19	100.4	50.0	50.59	101.2	50.89	101.8	51.65	103.3	51.35	102.7	52.21	104.4
Nickel	NI	ICP	IP090771	1000.0	1014.23	101.4	1000.0	1014.93	101.5	1001.38	100.1	996.21	99.6	988.51	98.9		
Selenium	SE	ICP	IP090771	2000.0	2024.66	101.2	2000.0	2022.66	101.1	2009.45	100.5	1992.33	99.6	1996.95	99.8		
Thallium	TL	ICP	IP090771	2000.0	1979.77	99.0	2000.0	1974.99	98.7	1963.98	98.2	1954.60	97.7	1960.72	98.0		
Vanadium	V	ICP	IP090771	1000.0	1012.39	101.2	1000.0	1016.69	101.7	1006.73	100.7	1009.71	101.0	1003.36	100.3		
Zinc	ZN	ICP	IP090771	1000.0	997.64	99.8	1000.0	1000.77	100.1	985.13	98.5	988.53	98.9	980.35	98.0		

1057-60076

Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (1)

# Calibration Verification

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

UNITS: ug/L



ANALYTE	EL	M	RUN	CCVTV	CCV6 %R	CCV7 %R	CCV8 %R	CCV9 %R	CCV10 %R	CCV11 %R
Aluminum	AL	ICP	IP090771	2000.0						
Arsenic	AS	PMS	MS090881	50.0	48.83	97.7	49.45	98.9	49.59	99.2
Cadmium	CD	ICP	IP090771	1000.0						
Chromium	CR	ICP	IP090771	1000.0						
Copper	CU	ICP	IP090771	1000.0						
Lead	PB	PMS	MS090881	50.0	51.42	102.8	52.81	105.6	52.93	105.9
Nickel	NI	ICP	IP090771	1000.0						
Selenium	SE	ICP	IP090771	2000.0						
Thallium	TL	ICP	IP090771	2000.0						
Vanadium	V	ICP	IP090771	1000.0						
Zinc	ZN	ICP	IP090771	1000.0						

Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (1)

TK57-00071

## Calibration Verification

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



UNITS: ug/L

ANALYTE	EL	M	RUN	ICVV	ICV	%R	CCVTV	CCV1	%R	CCV2	%R	CCV3	%R	CCV4	%R	CCV5	%R
Arsenic	AS	PMS	MSG090981	50.0	50.04	100.1	50.0	50.17	100.3	49.18	98.4	49.43	98.9	48.90	97.8	48.44	96.9

TK57: 00072

Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (1)

# Calibration Verification

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

ANALYTE	EL	M	RUN	CCV7	CCV6 %R	CCV7 %R	CCV8 %R	CCV9 %R	CCV10 %R	CCV11 %R
Arsenic	AS	PMS	MS090981	50.0	48.62	97.2	49.29	98.6	49.49	99.0

UNITS: ug/L

17657 : 00073



Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (1)

## CRDL Standard

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



UNITS: ug/L

ANALYTE	EL	M	RUN	CRA/I	TV	CR-1	%R	CR-2	%R	CR-3	%R	CR-4	%R	CR-5	%R	CR-6	%R
Aluminum	AL	ICP	IP090771	50.0		51.84	103.7			53.75	107.5						
Arsenic	AS	PMS	MS090881	0.2		0.19	95.0										
Cadmium	CD	ICP	IP090771	2.0		1.82	91.0			1.93	96.5						
Chromium	CR	ICP	IP090771	5.0		5.59	111.8			5.37	107.4						
Copper	CU	ICP	IP090771	2.0		2.05	102.5			2.23	111.5						
Lead	PB	PMS	MS090881	0.1		0.11	110.0										
Nickel	NI	ICP	IP090771	10.0		10.23	102.3			9.96	99.6						
Selenium	SE	ICP	IP090771	50.0		56.60	113.2			62.23	124.5						
Thallium	TL	ICP	IP090771	50.0		50.48	101.0			50.81	101.6						
Vanadium	V	ICP	IP090771	3.0		2.95	98.3			2.90	96.7						
Zinc	ZN	ICP	IP090771	10.0		9.49	94.9			8.70	87.0						

Control Limits: no control limits have been established by the EPA at this time.

## CRDI Standard

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

ANALYTE	EL	M	RUN	CRA/I TV	CR-1	%R	CR-2	%R	CR-3	%R	CR-4	%R	CR-5	%R	CR-6	%R
Arsenic	AS	PMS	MS090981	0.2	0.20	100.0										

UNITS: ug/L

Control Limits: no control limits have been established by the EPA at this time.

FORM II (2)

TKS7 : 000075



# Calibration Blanks

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



UNITS: ug/L

ANALYTE	EL	METH	RUN	CRDL	IDL	ICB	C	CCB1	C	CCB2	C	CCB3	C	CCB4	C	CCB5	C
Aluminum	AL	ICP	IP090771	200.0	50.0	50.0	U										
Arsenic	AS	PMS	MS090881	10.0	0.2	0.2	U										
Cadmium	CD	ICP	IP090771	5.0	2.0	2.0	U										
Chromium	CR	ICP	IP090771	10.0	5.0	5.0	U										
Copper	CU	ICP	IP090771	25.0	2.0	2.0	U										
Lead	PB	PMS	MS090881	3.0	0.1	0.1	U										
Nickel	NI	ICP	IP090771	40.0	10.0	10.0	U										
Selenium	SE	ICP	IP090771	5.0	50.0	50.0	U										
Thallium	Tl	ICP	IP090771	10.0	50.0	50.0	U										
Vanadium	V	ICP	IP090771	50.0	3.0	3.0	U										
Zinc	ZN	ICP	IP090771	20.0	10.0	10.0	U										

TK57 : 000076

# Calibration Blanks

CLIENT: Geomatrix, Inc.

PROJECT: ERP 2011 Shoreline I

SDG: TK57



UNITS: ug/L

ANALYTE	EL	METH	RUN	CRDL	IDL	CCB6	C	CCB7	C	CCB8	C	CCB9	C	CCB10	C	CCB11	C
Aluminum	AL	ICP	IP090771	200.0	50.0												
Arsenic	AS	PMS	MS090881	10.0	0.2	0.2	v	0.2	v	0.2	v	0.2	v	0.2	v	0.2	v
Cadmium	CD	ICP	IP090771	5.0	2.0												
Chromium	CR	ICP	IP090771	10.0	5.0												
Copper	CU	ICP	IP090771	25.0	2.0												
Lead	PB	PMS	MS090881	3.0	0.1	0.1	v	0.1	v	0.1	v	0.1	v	0.1	v	0.1	v
Nickel	NI	ICP	IP090771	40.0	10.0												
Selenium	SE	ICP	IP090771	5.0	50.0												
Thallium	TL	ICP	IP090771	10.0	50.0												
Vanadium	V	ICP	IP090771	50.0	3.0												
Zinc	ZN	ICP	IP090771	20.0	10.0												

TK57 : 00077

## Calibration Blanks

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



UNITS: ug/L

ANALYTE	EL	METH	RUN	CRDL	TDL	ICB	C	CCB1	C	CCB2	C	CCB3	C	CCB4	C	CCB5	C	CCB5	C
Arsenic	AS	PMS	MS090981	10.0	0.2	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U

## Calibration Blanks

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



UNITS: ug/L

ANALYTE	EL	METH	RUN	CRDL	IDL	CCB6	C	CCB7	C	CCB8	C	CCB9	C	CCB10	C	CCB11	C
Arsenic	AS	PMS	MS090981	10.0	0.2	0.2	0	0.2	0	0.2	0	0.2	0	0.2	0	0.2	0

TK57 - 66679

# ICP Interference Check Sample

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



ICS SOURCE: I.V.

RUNID: IPO90771

INSTRUMENT ID: OPTIMA ICP 2

UNITS: ug/L

ANALYTE	ICSA TV	ICSAB TV	ICSAI	ICSA BI	%R	ICSA2	ICSA B2	%R	ICSA3	ICSA B3	%R
Aluminum	2000000	2000000	200949.2	200098.8	100.0	196142.4	196785.4	98.4			
Antimony	1000		-6.9	960.6	96.1	-5.8	945.9	94.6			
Arsenic	1000		14.3	1029.3	102.9	16.2	1006.1	100.6			
Barium	1000		0.7	1021.2	102.1	1.6	988.7	98.9			
Beryllium	1000		0.1	1006.8	100.7	0.1	983.2	98.3			
Boron			-5.5	-6.1		-6.7	-6.8				
Cadmium	1000		1.3	1027.6	102.6	1.2	1017.5	101.8			
Calcium	1000000	1000000	102977.6	102374.8	102.4	101093.1	100652.0	100.7			
Chromium	1000		-0.2	1023.5	102.4	-0.4	995.0	99.5			
Cobalt	1000		1.0	998.1	99.8	1.1	986.5	98.7			
Copper	1000		0.3	1043.7	104.4	0.5	1033.6	103.4			
Iron	2000000	2000000	200678.0	196302.8	98.2	194794.0	192518.4	96.3			
Lead	1000		-3.8	977.1	97.7	-3.5	964.3	96.4			
Magnesium	1000000	1000000	103907.0	99450.1	99.5	100834.8	97635.6	97.6			
Manganese	1000		0.4	966.0	96.6	0.0	947.6	94.6			
Molybdenum			0.8	1.3		0.8	0.8				
Nickel	1000		1.1	973.3	97.3	0.0	942.8	94.3			
Potassium			11.5	252.6		48.9	271.1				
Selenium	1000		15.7	1031.0	103.1	12.5	1011.4	101.1			
Silicon			-11.2	-1.5		1.9	-2.4				
Silver	1000		-0.4	1037.2	103.7	-0.5	1012.1	101.2			
Sodium			11.3	8.8		27.3	22.5				
Strontium			10.5	10.3		10.2	10.1				
Thallium	1000		19.5	980.1	98.0	17.0	959.8	96.0			
Tin			-11.7	-12.0		-12.4	-11.2				
Titanium			5.9	7.3		5.7	6.3				
Vanadium	1000		-1.0	991.0	99.1	-1.4	978.2	97.8			
Zinc	1000		0.4	961.8	96.2	0.3	935.1	93.5			

TK57 : 000866

# ICP Interference Check Sample

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57



ICS SOURCE: I.V.

RUNID: MS090881

INSTRUMENT ID: PE ELAN 6000

UNITS: ug/L

ANALYTE	ICSA TV	ICSAB TV	ICSA1	ICSA1 %R	ICSA2	ICSA2 %R	ICSA3	ICSA3 %R
Antimony			0.1	0.1				
Cadmium	20		0.0	20.0	100.0			
Iron	20000	20000	20167.9	20414.6	102.1			
Silver	20		0.0	19.4	97.0			

MS-090881

# ICP Interference Check Sample



CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

ICS SOURCE: I.V.

RUNID: MS090981

INSTRUMENT ID: PE ELAN 6000

UNITS: ug/L

ANALYTE	ICSA TV	ICSAB TV	ICSA1	ICSA1I	%R	ICSA2	ICSA2I	%R	ICSA3	ICSA3I	%R
Cadmium	20	0.0	19.5	97.5							
Chromium	20	0.7	20.1	100.5							
Cobalt	20	0.0	19.1	95.5							
Copper	20	0.4	19.6	98.0							
Manganese	20	0.5	20.1	100.5							
Molybdenum	400	400.8	392.6	98.2							
Nickel	20	0.5	18.9	94.5							
Silver	20	0.0	19.1	95.5							
Vanadium		0.0	-0.4								
Zinc	20	0.9	19.9	99.5							

TK57-00082

# ICP Serial Dilutions

ANALYTICAL  
RESOURCES  
INCORPORATED

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

ANALYSIS METHOD: ICP

SDG: TK57

UNITS: ug/L

ANALYTE	CLIENT ID	ARI ID	MATRIX	RUNID	INITIAL SAMPLE RESULT (I)	SERIAL DILUTION RESULT (S)		% DIFFER- ENCE	Q
						C	C		
Aluminum	FRP-083111-001L	TK57A-L	Water	IP090771	3049.54	3150.75		3.3	
Cadmium	FRP-083111-001L	TK57A-L	Water	IP090771	-0.11 u	10.00 u			
Chromium	FRP-083111-001L	TK57A-L	Water	IP090771	7.19 B	25.00 u	100.0		
Copper	FRP-083111-001L	TK57A-L	Water	IP090771	14.83 B	14.20 B		4.2	
Nickel	FRP-083111-001L	TK57A-L	Water	IP090771	2.37 u	50.00 u			
Selenium	FRP-083111-001L	TK57A-L	Water	IP090771	10.30 u	250.00 u			
Thallium	FRP-083111-001L	TK57A-L	Water	IP090771	3.86 u	250.00 u			
Vanadium	FRP-083111-001L	TK57A-L	Water	IP090771	126.61	127.50 B		0.7	
Zinc	FRP-083111-001L	TK57A-L	Water	IP090771	6.61 u	50.00 u			

# ICP Serial Dilutions

ANALYTICAL  
RESOURCES  
INCORPORATED

CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

ANALYSIS METHOD: PMS

SDG: TK57

UNITS: ug/L

ANALYTE	CLIENT ID	ARI ID	MATRIX	RUNID	INITIAL	SERIAL	% DIFFER- ENCE	Q
					SAMPLE RESULT (I)	DILUTION RESULT (S)		
Arsenic	FRP-083111-001L	TK57A-L	Water	MS090881	6.34 B	6.55 B	3.3	
Lead	FRP-083111-001L	TK57A-L	Water	MS090881	1.25 B	1.35 B	8.0	

**IDLs and ICP  
Linear Ranges**



CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

UNITS: ug/L

ANALYTE	EL	METH	INSTRUMENT	WAVELENGTH (nm)	BACK- GROUND	GFA		RL DATE	ICP LINEAR RANGE (ug/L)	ICP LR DATE
						CLP	CRDL			
Aluminum	AL	ICP	OPTIMA ICP 2	308.22		200	50.0	4/1/2011	250000.0	8/3/2011
Arsenic	AS	PMS	PE ELAN 6000 MS	0.00		10	0.2	4/1/2011		
Cadmium	CD	ICP	OPTIMA ICP 2	228.80		5	2.0	4/1/2011	20000.0	8/3/2011
Chromium	CR	ICP	OPTIMA ICP 2	267.72		10	5.0	4/1/2011	100000.0	8/3/2011
Copper	CU	ICP	OPTIMA ICP 2	324.75		25	2.0	4/1/2011	40000.0	8/3/2011
Lead	PB	PMS	PE ELAN 6000 MS	0.00		3	0.1	4/1/2011		
Nickel	NI	ICP	OPTIMA ICP 2	231.60		40	10.0	4/1/2011	100000.0	8/3/2011
Selenium	SE	ICP	OPTIMA ICP 2	196.02		5	50.0	4/1/2011	20000.0	8/3/2011
Thallium	TL	ICP	OPTIMA ICP 2	190.86		10	50.0	4/1/2011	30000.0	8/3/2011
Vanadium	V	ICP	OPTIMA ICP 2	292.40		50	3.0	4/1/2011	50000.0	8/3/2011
Zinc	ZN	ICP	OPTIMA ICP 2	213.86		20	10.0	4/1/2011	100000.0	8/3/2011

# ICP Interelement Correction Factors

CLIENT: Geomatrix, Inc.  
 PROJECT: FRP 2011 Shoreline I  
 SDG: TK57



IEC DATE: 9/7/2011  
 INSTRUMENT ID: OPTIMA ICP 2

ANALYTE	WAVELENGTH	AL	AS	BA	BE	CA	CD	CO	CR	CU	FE
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	10.6149000	0.0000000	0.0000000
Arsenic	188.98	0.0000000	0.0000000	0.0000000	0.0000000	0.0733398	0.0000000	-0.8343790	1.1215100	0.0000000	0.0000000
Barium	233.53	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.1892080	0.0000000	0.0000000	0.0622379
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	228.80	0.0000000	5.2418600	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.1185910	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.5252460	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0187178	0.0000000	0.0000000	0.0000000	0.0000000	-0.0439811
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.1238430	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.22249050	-0.03188969	0.0000000	-0.0695283
Iron	273.96	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-1.6163900	0.0000000	0.0000000
Lead	220.35	-0.1778670	0.0000000	0.0000000	0.0000000	-0.0252598	0.0000000	0.0000000	-2.3072100	1.2452600	0.0570036
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.1525560	0.0000000	-1.6380600	-1.2519300	0.0000000	0.6727000
Manganese	257.61	0.0051426	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.0048944
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0228298	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0634207	0.0000000	0.3514040	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-3.4885200	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	6.5805300	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.80	0.0000000	0.0000000	0.0000000	0.0000000	0.0676735	0.0000000	1.7836600	0.3515820	0.0000000	-0.1294840
Tin	189.93	0.0000000	0.0000000	0.0000000	0.0000000	-0.1147000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.90	0.0000000	0.0000000	0.0000000	0.0000000	0.1641450	0.0000000	0.1632010	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-3.9361800	0.0000000	0.1100040	0.0000000
Zinc	206.20	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.1475900	0.0000000	0.0000000	0.0000000

TK57: 00086

# ICP Interelement Correction Factors

CLIENT: Geomatrix, Inc.  
 PROJECT: FRP 2011 Shoreline I  
 SDG: TK57



IEC DATE: 9/7/2011  
 INSTRUMENT ID: OPTIMA ICP 2

ANALYTE	WAVELENGTH	MG	MN	MD	NL	PB	SB	TI	TL	V	ZN
Aluminum	308.22	0.0000000	0.0000000	15.3131000	0.0000000	0.0000000	0.0000000	1.5167500	0.0000000	17.6996000	0.0000000
Antimony	206.84	0.0000000	0.0000000	-0.4730780	0.0000000	0.0000000	-0.8897510	0.0000000	-3.3546800	0.0000000	
Arsenic	188.98	0.0000000	0.0000000	2.3330800	0.0000000	0.0000000	0.0000000	-5.4412000	0.0000000	0.0000000	
Barium	233.53	0.0000000	0.0000000	0.0000000	0.0766262	0.0000000	0.0000000	0.0000000	0.6419380	0.0000000	
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.2960780	0.0000000	
Cadmium	228.80	0.0000000	0.0000000	0.0000000	-0.7324130	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0581570	0.0000000	0.1395070	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.2773470	0.0000000
Cobalt	228.62	0.0000000	0.0000000	-0.1579570	0.1558330	0.0000000	0.0000000	1.8115900	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0080384	0.0000000	0.2688440	0.0000000	0.0000000	0.0000000	0.2461180	0.0000000	0.0000000	0.0000000
Iron	273.96	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	8.4403600	0.0000000
Lead	220.35	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	-4.6256200	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0048376	0.0000000	0.0000000	-0.2175850	0.0000000	0.0000000	0.0000000	0.0000000	-0.0271775	0.0000000
Molybdenum	202.03	0.0148620	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.7744280	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0735290	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	-0.1460000	0.0000000	-2.7358100	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.2442620	0.2419260	0.0000000	0.0000000	0.0000000	-0.0470302	0.0000000	-0.2758680	0.0000000
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	42.4230000	0.0000000	0.0000000	18.1570000
Thallium	190.80	0.0000000	-1.4179000	1.9562000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	1.2892100	0.0000000
Tin	189.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.5848020	-0.3044710	0.0000000	0.0000000	0.0000000
Titanium	334.90	0.0000000	0.0000000	0.9873960	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	-0.1398510	-0.6804250	0.0000000	0.0000000	0.0000000	0.6004670	0.0000000	0.0000000	0.0000000
Zinc	206.20	0.0000000	0.0000000	0.2377960	0.0000000	-0.0708227	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

TK57-08867

# Preparation Log



CLIENT: Geomatrix, Inc.

ANALYSIS METHOD: ICP

PROJECT: FRP 2011 Shoreline I

ARI PREP CODE: TWC

SDG: TK57

PREPDATE: 9/2/2011

CLIENT ID	ARI ID	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)
FRP-083111-001	TK57A	0.000	50.0	50.0
FRP-083111-001D	TK57ADUP	0.000	50.0	50.0
FRP-083111-001S	TK57ASPK	0.000	50.0	50.0
FRP-083111-002	TK57B	0.000	50.0	50.0
FRP-083111-003	TK57C	0.000	50.0	50.0
FRP-083111-004	TK57D	0.000	50.0	50.0
FRP-083111-005	TK57E	0.000	50.0	50.0
FRP-083111-006	TK57F	0.000	50.0	50.0
PBW	TK57MB1	0.000	50.0	50.0
LCSW	TK57MB1SPK	0.000	50.0	50.0

# Preparation Log

ANALYTICAL  
RESOURCES  
INCORPORATED

CLIENT: Geomatrix, Inc.

ANALYSIS METHOD: PMS

PROJECT: FRP 2011 Shoreline I

ARI PREP CODE: REN

SDG: TK57

PREPDATE: 9/2/2011

CLIENT ID	ARI ID	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)
FRP-083111-001	TK57A	0.000	50.0	25.0
FRP-083111-001D	TK57ADUP	0.000	50.0	25.0
FRP-083111-001S	TK57ASPK	0.000	50.0	25.0
FRP-083111-002	TK57B	0.000	50.0	25.0
FRP-083111-003	TK57C	0.000	50.0	25.0
FRP-083111-004	TK57D	0.000	50.0	25.0
FRP-083111-005	TK57E	0.000	50.0	25.0
FRP-083111-006	TK57F	0.000	50.0	25.0
PBW	TK57MB1	0.000	50.0	25.0
LCSW	TK57MB1SPK	0.000	50.0	25.0

# Analysis Run Log

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

INSTRUMENT ID: OPTIMA ICP 2  
RUNID: IP090771

START DATE: 9/7/2011  
END DATE: 9/7/2011

CLIENT ID	ARI ID	DIL.	TIME	%R	AG	AL	B	BA	BE	CA	CD	CO	CR	CU	FE	HG	K	MG	MN	MO	NA	NI	FB	SB	SE	SI	SN	TI	TL	U	V	ZN
SO	SO	1.00	12164																													
S2	S2	1.00	12205																													
S3	S3	1.00	12225																													
S4	S4	1.00	12251																													
S5	S5	1.00	12272																													
ICV	ICV	1.00	12310																													
ICB	ICB	1.00	12350																													
CRI	CRI	1.00	12391																													
ICSA	ICSAI	1.00	12432																													
ICSAB	ICSABI	1.00	12473																													
CCV	CCV1	1.00	12511																													
CCB	CCB1	1.00	12551																													
PBW	TK57MB1	1.00	12592																													
FRP-083111-001L	TK57A-L	5.00	13033																													
FRP-083111-001	TK57A	1.00	13075																													
FRP-083111-001D	TK57ADUP	1.00	13120																													
FRP-083111-001S	TK57ASPK	1.00	13161																													
ZZZZZZ	ZZZZZZ	1.00	13202																													
FRP-083111-002	TK57B	1.00	13244																													
FRP-083111-003	TK57C	1.00	13285																													
FRP-083111-004	TK57D	1.00	13330																													
LCSW	TK57MB1SPK	1.00	13373																													
CCV	CCV2	1.00	13413																													
CCB	CCB2	1.00	13453																													
FRP-083111-005	TK57E	1.00	13494																													
FRP-083111-006	TK57F	1.00	13535																													
CCV	CCV3	1.00	13580																													
CCB	CCB3	1.00	14020																													
CRI	CRI	1.00	14061																													
ICSA	ICSAF	1.00	14102																													
ICSAB	ICSABF	1.00	14143																													
CCV	CCV4	1.00	14182																													
CCB	CCB4	1.00	14222																													

TK57 : 066996

# Analysis Run Log

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

INSTRUMENT ID: PE ELAN 6000 MS  
RUNID: MS090881 METHOD: PMS

START DATE: 9/8/2011  
END DATE: 9/8/2011

CLIENT ID	ART ID	DIL.	TIME	%R	AG	AL	A%	B	BA	BE	CA	CD	CO	CR	CU	FE	HG	K	MG	MN	MO	NA	NI	PB	SB	SE	SI	T1	T2	U	V	ZN
SO	SO		1.00 08420																											X		
S1	S1		1.00 08480																										X	X		
S2	S2		1.00 08550																										X	X		
S3	S3		1.00 09020																										X	X		
S4	S4		1.00 09080																										X	X		
ZZZZZZ	Rinse Samp1		1.00 09150																													
ICV	MICV		1.00 09210																										X	X		
ICB	ICB		1.00 09270																										X	X		
CCV	MCCV1		1.00 09340																										X	X		
CCB	CCB1		1.00 09440																										X	X		
CRI	MCRI		1.00 09500																										X	X		
ICSA	ICSAI		1.00 09570																										X	X		
ICSAB	ICSAIBI		1.00 10030																										X	X		
CCV	MCCV2		1.00 10100																										X	X		
CCB	CCB2		1.00 10160																										X	X		
ZZZZZZ	TJ71RMB2		1.00 10220																													
ZZZZZZ	TJ71RME2SPK		1.00 10280																													
ZZZZZZ	TJ71RF		1.00 10330																													
ZZZZZZ	TJ71RG		1.00 10390																													
ZZZZZZ	TJ71RH		1.00 10450																													
ZZZZZZ	TJ71RI		1.00 10500																													
ZZZZZZ	TJ71RJ		1.00 10560																													
CCV	MCCV3		1.00 11020																													
CCB	CCB3		1.00 11080																										X	X		
PBW	TK57MB1		2.00 11140																										X	X		
LCSW	TK57MB1SPK		2.00 11200																										X	X		
FRP-083111-001L	TK57A-L		10.00 11250																										X	X		
FRP-083111-001	TK57A		2.00 11310																									X	X			
FRP-083111-001D	TK57ADUP		2.00 11370																									X	X			
FRP-083111-001S	TK57ASFK		2.00 11420																									X	X			
ZZZZZZ	TK70A-L		10.00 11480																													
ZZZZZZ	TK70A		2.00 11540																													
ZZZZZZ	TK70ADUP		2.00 12000																													
ZZZZZZ	TK70ASFK		2.00 12050																													
CCV	MCCV4		1.00 12110																													

## Analysis Run Log

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

INSTRUMENT ID: PE ELAN 6000 MS  
RUNID: MS090881 METHOD: PMS

START DATE: 9/8/2011  
END DATE: 9/8/2011

CLIENT ID	ART ID	DIL.	TIME	%R	AG	AL	AS	B	BA	BE	CA	CD	CO	CR	CU	FE	GG	K	MG	MN	NO	NA	NI	PB	SH	SE	SI	SN	TI	TL	U	V	ZN
CCB	CCB4		1.00 12170																														
ZZZZZZ	TK70MB1		2.00 12230																														
ZZZZZZ	TK70MB1SPK		2.00 12290																														
ZZZZZZ	TK88A-L		10.00 12350																														
ZZZZZZ	TK88A		2.00 12400																														
ZZZZZZ	TK88ADUP		2.00 12460																														
ZZZZZZ	TK88ASPK		2.00 12510																														
FRP-083111-002	TK57B		2.00 12570																														
FRP-083111-003	TK57C		2.00 13030																														
FRP-083111-004	TK57D		2.00 13080																														
FRP-083111-005	TK57E		2.00 13140																														
CCV	MCCV5		1.00 13200																														
CCB	CCB5		1.00 13260																														
S0	S0		1.00 13330																														
CCV	MCCV6		1.00 13390																														
CCB	CCB6		1.00 13450																														
FRP-083111-006	TK57F		2.00 13520																														
ZZZZZZ	TK70B		2.00 13570																														
ZZZZZZ	TK70C		2.00 14030																														
ZZZZZZ	TK70D		2.00 14080																														
ZZZZZZ	TK70E		2.00 14140																														
ZZZZZZ	TK70F		2.00 14200																														
ZZZZZZ	TK70G		2.00 14250																														
ZZZZZZ	TK70H		2.00 14310																														
ZZZZZZ	TK88B		2.00 14360																														
ZZZZZZ	TK88C		2.00 14420																														
CCV	MCCV7		1.00 14480																														
CCB	CCB7		1.00 14540																														
S0	S0		1.00 15000																														
CCV	MCCV8		1.00 15230																														
CCB	CCB8		1.00 15290																														
ZZZZZZ	TK88B		5.00 15350																														
ZZZZZZ	TK88C		5.00 15410																														
FRP-083111-006	TK57F		2.00 15470																														
ZZZZZZ	TK70B		2.00 15520																														

## Analysis Run Log



CLIENT: Geomatrix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

INSTRUMENT ID: PE ELAN 6000 MS  
RUNID: MS090881 METHOD: PMS

START DATE: 9/8/2011  
END DATE: 9/8/2011

CLIENT ID	ARI ID	DIL.	TIME	\$R	AG AL AS B	BA BE CA CD CO CR CU ER HG K MG MN MO NA NI PB SB SE SI SN TI TL U V ZN	
ZZZZZZ	TK70C	5.00	15580				
ZZZZZZ	TK70D	2.00	16030				
ZZZZZZ	TK70E	5.00	16090				
ZZZZZZ	TK70F	2.00	16150				
ZZZZZZ	TK70G	2.00	16200				
ZZZZZZ	TK70H	2.00	16260				
CCV	MCCV9	1.00	16310	X			
CCB	CCB9	1.00	16380	X			
ZZZZZZ	TK70D	5.00	16440				
ZZZZZZ	TK70F	5.00	16490				
ZZZZZZ	TK70G	5.00	16550				
ZZZZZZ	TK70H	5.00	17010				
CCV	MCCV10	1.00	17060	X			
CCB	CCB10	1.00	17130	X			
ZZZZZZ	TK88MBL	2.00	17190				
ZZZZZZ	TK50WB1	20.00	17240				
ZZZZZZ	TK50MB1SPK	20.00	17300				
FRP~083111~004	TK88MB1SPK	2.00	17360				
ZZZZZZ	TK57D	2.00	17410				
ZZZZZZ	TK50ADUP	20.00	17470				
ZZZZZZ	TK50A	20.00	17530				
ZZZZZZ	TK50ASPK	20.00	17580				
ZZZZZZ	TK50B	20.00	18040				
ZZZZZZ	TK50C	20.00	18090				
CCV	MCCV11	1.00	18150	X			
CCB	CCB11	1.00	18210	X			

TK57 :: 00093

# Analysis Run Log

CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SPG: TK57

INSTRUMENT ID: PE ELAN 6000 MS  
RUNID: MS090981

START DATE: 9/9/2011  
END DATE: 9/9/2011

CLIENT ID	ART ID	DIL. TIME	%R	AG AL AS B EA BE CA CD CO CR CU WE HG K MG MN NO NA NT PB SE SI SN TI TL U V ZN
S0	S0	1.00 09330	X	
S1	S1	1.00 09410	X	
S2	S2	1.00 09490	X	
S3	S3	1.00 09560	X	
S4	S4	1.00 10040	X	
ZZZZZZ	Rinse Samp1	1.00 10120		
ICV	MICV	1.00 10190	X	
ICB	ICB	1.00 10270	X	
CCV	MCCV1	1.00 10340	X	
CCB	CCB1	1.00 10410	X	
ZZZZZZ	ZZZZZZ	1.00 10480		
ZZZZZZ	ZZZZZZ	1.00 10560		
ZZZZZZ	ZZZZZZ	1.00 11030		
ZZZZZZ	LR200	1.00 11110		
ZZZZZZ	LR300	1.00 11180		
CCV	MCCV2	1.00 11260	X	
CCB	CCB2	1.00 11330	X	
S0	S0	1.00 11540	X	
CCV	MCCV3	1.00 12010	X	
CCB	CCB3	1.00 12090	X	
CRI	MCRI	1.00 12170	X	
ICSA	ICSAI	1.00 12240	X	
ICSA	ICSABI	1.00 12320	X	
CCV	MCCV4	1.00 12410	X	
CCB	CCB4	1.00 12480		
ZZZZZZ	TL12MB1	2.00 12550		
ZZZZZZ	TL12MB2	2.00 13010		
ZZZZZZ	TL12MB1SPK	2.00 13080		
ZZZZZZ	TL12MB2SPK	2.00 13150		
ZZZZZZ	TL12A	2.00 13210		
ZZZZZZ	TL12B	2.00 13280		
FRP-083111-004	TK57D	2.00 13340		
ZZZZZZ	TK50E	20.00 13410		
ZZZZZZ	TL08B	20.00 13480		
ZZZZZZ	TL08C	20.00 13540		

# Analysis Run Log

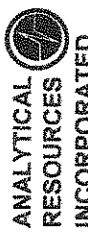
CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

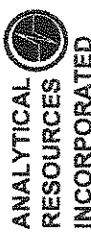
INSTRUMENT ID: PE ELAN 6000 MS  
RUNID: MS090981 METHOD: PMS

START DATE: 9/9/2011  
END DATE: 9/9/2011



CLIENT ID	ART ID	DIL.	TIME	%R	AG	AL	A%	B%	BA%	BE%	CA%	CD%	CO%	CR%	CU%	F%	H%	G%	K%	M%	N%	M0%	N0%	DO%	NA%	NI%	P%	S%	SE%	SI%	SN%	TI%	TL%	U%	V%	Z%
CCV	MCCV5	1.00	14010																																	
CCB	CCB5	1.00	14080																																	
SO	SO	1.00	14150																																	
CCV	MCCV6	1.00	14230																																	
CCB	CCB6	1.00	14300																																	
ZZZZZZ	TL08MB2	2.00	14370																																	
ZZZZZZ	TL08MB2SPK	2.00	14440																																	
ZZZZZZ	ZZZZZZ	10.00	14510																																	
ZZZZZZ	TK88A	2.00	14570																																	
ZZZZZZ	TK88ADUP	2.00	15040																																	
ZZZZZZ	TK88ASPK	2.00	15100																																	
ZZZZZZ	ZZZZZZ	10.00	15170																																	
ZZZZZZ	TL08M	2.00	15230																																	
ZZZZZZ	TL08D	20.00	15300																																	
ZZZZZZ	TL08E	20.00	15360																																	
CCV	MCCV7	1.00	15430																																	
CCB	CCB7	1.00	15500																																	
SO	SO	1.00	15570																																	
CCV	MCCV8	1.00	16070																																	
CCB	CCB8	1.00	16150																																	
ZZZZZZ	TL38MB1	20.00	16220																																	
ZZZZZZ	TL38MB1SPK	20.00	16290																																	
ZZZZZZ	ZZZZZZ	100.00	16360																																	
ZZZZZZ	TL38A	20.00	16420																																	
ZZZZZZ	TL08F	20.00	16490																																	
ZZZZZZ	TL08G	20.00	16550																																	
ZZZZZZ	TL08H	20.00	17020																																	
ZZZZZZ	TL08I	20.00	17090																																	
ZZZZZZ	TL08J	20.00	17150																																	
ZZZZZZ	TL08K	20.00	17220																																	
CCV	MCCV9	1.00	17280																																	
CCB	CCB9	1.00	17350																																	
ZZZZZZ	TL08MB1	20.00	17430																																	
ZZZZZZ	TL08MB1SPK	20.00	17490																																	
ZZZZZZ	TL08A-L	100.00	17560																																	

## Analysis Run Log



CLIENT: Geomatix, Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK57

INSTRUMENT ID: PE ELAN 6000 MS  
RUNID: MS090981 METHOD: PMS

START DATE: 9/9/2011  
END DATE: 9/9/2011

CLIENT ID	ARI ID	DIL.	TIME	*R	*AG	AL	A	S	B	BA	BE	CA	CD	CO	CR	CU	EE	HG	K	MG	MN	MO	NA	NI	PB	SB	SE	SI	SN	TI	TL	U	V	ZM
ZZZZZZ	TL08A	20.00	18020																															
ZZZZZZ	TL08ADUP	20.00	18090																															
ZZZZZZ	TL08ASPK	20.00	18150																															
ZZZZZZ	ZZZZZZZ	20.00	18220																															
ZZZZZZ	TL08L	20.00	18280																															
ZZZZZZ	TK85A	20.00	18350																															
ZZZZZZ	TK85B	20.00	18420																															
CCV	MCCV10	1.00	18480																															
CCB	CCB10	1.00	18550																															
ZZZZZZ	TK85MB	20.00	19030																															
ZZZZZZ	TK85MBSPK	20.00	19030																															
ZZZZZZ	TK88A-L	25.00	19160																															
ZZZZZZ	TK88A	5.00	19220																															
ZZZZZZ	TK88ADUP	5.00	19290																															
ZZZZZZ	TK88ASEK	5.00	19350																															
FRP-083111-004	TK57D	5.00	19420																															
ZZZZZZ	TK85C	20.00	19480																															
CCV	MCCV11	1.00	19550																															
CCB	CCB11	1.00	20020																															

TK857 : 066666

Mercury Analysis  
Report and Summary QC Forms

ARI Job ID: TK57, TK58

**Cover Page****INORGANIC ANALYSIS DATA PACKAGE**

ANALYTICAL  
RESOURCES  
INCORPORATED

CLIENT: Amec Geomatrix Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK58

CLIENT ID	ARI ID	ARI LIMS ID	REPREP
FRP-083111-001	TK58A	11-18921	
FRP-083111-001D	TK58ADUP	11-18921	
FRP-083111-001S	TK58ASPK	11-18921	
FRP-083111-002	TK58B	11-18922	
PBW	TK58MB1	11-18922	
LCSW	TK58MB1SPK	11-18922	
FRP-083111-003	TK58C	11-18923	
FRP-083111-004	TK58D	11-18924	
FRP-083111-005	TK58E	11-18925	
FRP-083111-006	TK58F	11-18926	

Were ICP interelement corrections applied ? Yes/No YES

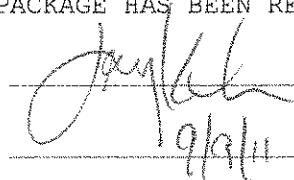
Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO

Comments:

THIS DATA PACKAGE HAS BEEN REVIEWED AND AUTHORIZED FOR RELEASE BY:

Signature:



Name: Jay Kuhn

Date:

9/3/11

Title: Inorganics Director

**INORGANICS ANALYSIS DATA SHEET**  
**Total Mercury by Method SW7470A**

Data Release Authorized: *[Signature]*  
 Reported: 09/09/11  
 Date Received: 08/31/11  
 Page 1 of 1

QC Report No: TK58-Amec Geomatrix Inc.  
 Project: FRP 2011 Shoreline Investigation  
 8769

**ANALYTICAL  
RESOURCES  
INCORPORATED**

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
FRP-083111-001 TK58A 11-18921	08/31/11	Water	09/02/11 09/09/11	20.0	99.4
FRP-083111-002 TK58B 11-18922	08/31/11	Water	09/02/11 09/09/11	20.0	104
FRP-083111-003 TK58C 11-18923	08/31/11	Water	09/02/11 09/09/11	20.0	123
FRP-083111-004 TK58D 11-18924	08/31/11	Water	09/02/11 09/09/11	20.0	45.0
FRP-083111-005 TK58E 11-18925	08/31/11	Water	09/02/11 09/09/11	20.0	20.0 U
FRP-083111-006 TK58F 11-18926	08/31/11	Water	09/02/11 09/09/11	20.0	20.0 U
MB-090211 Method Blank	NA	Water	09/02/11 09/09/11	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit  
 U-Undetected at reported detection limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Lab Sample ID: TK58A

LIMS ID: 11-18921

Matrix: Water

Data Release Authorized:

Reported: 09/09/11

Sample ID: FRP-083111-001

MATRIX SPIKE

QC Report No: TK58-Amec Geomatrix Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	99.4	203	100	104%	

Reported in ng/L

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

**INORGANICS ANALYSIS DATA SHEET**
**TOTAL METALS**

Page 1 of 1

Lab Sample ID: TK58A

LIMS ID: 11-18921

Matrix: Water

 Data Release Authorized: *[Signature]*

Reported: 09/09/11

Sample ID: FRP-083111-001

DUPLICATE

QC Report No: TK58-Amec Geomatrix Inc.

Project: FRP 2011 Shoreline Investigation

8769

Date Sampled: 08/31/11

Date Received: 08/31/11

**MATRIX DUPLICATE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	99.4	100	0.6%	+/- 20.0	L

Reported in ng/L

\*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

INORGANICS ANALYSIS DATA SHEET  
TOTAL METALS  
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: TK58LCS  
LIMS ID: 11-18922  
Matrix: Water  
Data Release Authorized:  
Reported: 09/09/11

QC Report No: TK58-Amec Geomatrix Inc.  
Project: FRP 2011 Shoreline Investigation  
8769  
Date Sampled: NA  
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	212	200	106%	

Reported in ng/L

N-Control limit not met  
Control Limits: 80-120%

## Calibration Verification

CLIENT: Amec Geomatix Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK58

UNITS: ng/L



ANALYTE	EL	M	RUN	ICVTV	ICV	%R	CCVTV	CCV1	%R	CCV2	%R	CCV3	%R	CCV4	%R	CCV5	%R
Mercury	HG	CVL	HG090901	500.0	503.00	100.6	500.0	508.00	101.6	514.00	102.8	517.00	103.4				

Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (1)

## CRDL Standard

CLIENT: Amec Geomatix Inc.

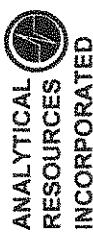
PROJECT: FRP 2011 Shoreline I

SDG: TK58

UNITS: ng/L

ANALYTE	EL	M	RUN	CRA/I	TV	CR-1	%R	CR-2	%R	CR-3	%R	CR-4	%R	CR-5	%R	CR-6	%R
Mercury	HG	CVL	HG090901	20.0		19.80		99.0									

Control Limits: no control limits have been established by the EPA at this time.



## Calibration Blanks

CLIENT: Amec Geomatix Inc.

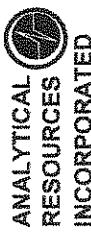
PROJECT: FRP 2011 Shoreline I

SDG: TK58

UNITS: ng/L

ANALYTE	EL	METH	RUN	CRDL	IDL	ICB	C	CCB1	C	CCB2	C	CCB3	C	CCB4	C	CCB5	C
Mercury	HG	CVL	HG090901	25.0	20.0	20.0	V										

TK57: 00105



**IDLs and ICP  
Linear Ranges**

**ANALYTICAL  
RESOURCES  
INCORPORATED**

CLIENT: Amec Geomatrix Inc.

IDL DATE: 4/1/2011

PROJECT: FRP 2011 Shoreline I

ICP LR DATE:

SDG: TK58

UNITS: ng/L

ANALYTE	EL	METH	INSTRUMENT	WAVELENGTH (nm)	GFA BACK- GROUND	CLP CRDL	RL	ICP LINEAR RANGE (ng/L)
Mercury	HG	CVL	CETAC MERCURY	253.70		25	20.0	

# Preparation Log

ANALYTICAL  
RESOURCES  
INCORPORATED

CLIENT: Amec Geomatrix Inc.

ANALYSIS METHOD: CVL

PROJECT: FRP 2011 Shoreline I

ARI PREP CODE: TLM

SDG: TK58

PREPDATE: 9/2/2011

CLIENT ID	ARI ID	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)
FRP-083111-001	TK58A	0.000	20.0	20.0
FRP-083111-001D	TK58ADUP	0.000	20.0	20.0
FRP-083111-001S	TK58ASPK	0.000	20.0	20.0
FRP-083111-002	TK58B	0.000	20.0	20.0
FRP-083111-003	TK58C	0.000	20.0	20.0
FRP-083111-004	TK58D	0.000	20.0	20.0
FRP-083111-005	TK58E	0.000	20.0	20.0
FRP-083111-006	TK58F	0.000	20.0	20.0
PBW	TK58MB1	0.000	20.0	20.0
LCSW	TK58MB1SPK	0.000	20.0	20.0

# Analysis Run Log

CLIENT: Amec Geomatix Inc.

PROJECT: FRP 2011 Shoreline I

SDG: TK58

INSTRUMENT ID: CETAC MERCURY  
RUNID: HG090901

START DATE: 9/9/2011  
END DATE: 9/9/2011

CLIENT ID	ARI ID	DIL.	TIME	%R	AG	AL	AS	B	BA	BE	CA	CD	CO	CR	CU	FE	HG	R	MG	MN	MO	NA	NT	PB	SB	SE	SI	SN	TI	TL	U	V	ZN
SO	SO		1.00 10583																														
S20	S20		1.00 11012																														
S50	S50		1.00 11040																														
S100	S100		1.00 11064																														
S200	S200		1.00 11092																														
S400	S400		1.00 11120																														
S1000	S1000		1.00 11145																														
ICV	AICV		1.00 11185																														
ICB	ICB		1.00 11213																														
CCV	ACCV1		1.00 11241																														
CCB	CCB1		1.00 11270																														
CRA	CRA		1.00 11294																														
FBW	TK58MB1		1.00 11322																														
LCSW	TK58MB1SPK		1.00 11350																														
FRP-083111-001	TK58A		1.00 11374																														
FRP-083111-001D	TK58ADDP		1.00 11402																														
FRP-083111-001S	TK58ASPK		1.00 11431																														
FRP-083111-002	TK58B		1.00 11455																														
FRP-083111-003	TK58C		1.00 11483																														
FRP-083111-004	TK58D		1.00 11511																														
FRP-083111-005	TK58E		1.00 11540																														
CCV	ACCV2		1.00 11564																														
CCB	CCB2		1.00 11593																														
FRP-083111-006	TK58F		1.00 12021																														
ZZZZZZ	TK89MB1		1.00 12045																														
ZZZZZZ	TK89MB1SPK		1.00 12073																														
ZZZZZZ	TK89A		1.00 12101																														
ZZZZZZ	TK89ADUP		1.00 12125																														
ZZZZZZ	TK89ASPK		1.00 12153																														
ZZZZZZ	TK89B		1.00 12181																														
ZZZZZZ	TK89C		1.00 12210																														
ZZZZZZ	TK75MB1		1.00 12234																														
ZZZZZZ	TK75MB1SPK		1.00 12262																														
CCV	ACCV3		1.00 12291																														
CCB	CCB3		1.00 12315																														

General Chemistry Analysis  
Report and Summary QC Forms

ARI Job ID: TK57, TK58

SAMPLE RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water  
Data Release Authorized: *MF*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga  
Event: 8769  
Date Sampled: 08/31/11  
Date Received: 08/31/11

Client ID: FRP-083111-001  
ARI ID: 11-18914 TK57A

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/31/11 083111#1	EPA 150.1	std units	0.01	7.03

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water

Data Release Authorized: *MJR*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga

Event: 8769

Date Sampled: 08/31/11

Date Received: 08/31/11

Client ID: FRP-083111-002  
ARI ID: 11-18915 TK57B

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/31/11 083111#1	EPA 150.1	std units	0.01	7.07

RL Analytical reporting limit

U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water  
Data Release Authorized *MF*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga  
Event: 8769  
Date Sampled: 08/31/11  
Date Received: 08/31/11

Client ID: FRP-083111-003  
ARI ID: 11-18916 TK57C

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/31/11 083111#1	EPA 150.1	std units	0.01	6.89

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water  
Data Release Authorized *JMB*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga  
Event: 8769  
Date Sampled: 08/31/11  
Date Received: 08/31/11

Client ID: FRP-083111-004  
ARI ID: 11-18917 TK57D

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/31/11 083111#1	EPA 150.1	std units	0.01	8.88

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water  
Data Release Authorized *MR*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga  
Event: 8769  
Date Sampled: 08/31/11  
Date Received: 08/31/11

Client ID: FRP-083111-005  
ARI ID: 11-18918 TK57E

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/31/11 083111#1	EPA 150.1	std units	0.01	6.59

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water  
Data Release Authorized *MP*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga  
Event: 8769  
Date Sampled: 08/31/11  
Date Received: 08/31/11

Client ID: FRP-083111-006  
ARI ID: 11-18919 TK57F

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/31/11 083111#1	EPA 150.1	std units	0.01	6.61

RL Analytical reporting limit  
U Undetected at reported detection limit

REPLICATE RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water  
Data Release Authorized *MF*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga  
Event: 8769  
Date Sampled: 08/31/11  
Date Received: 08/31/11

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: TK57A Client ID: FRP-083111-001						
pH	EPA 150.1	08/31/11	std units	7.03	7.04	0.01

pH is evaluated as the Absolute Difference between the values rather than  
Relative Percent Difference

LAB CONTROL RESULTS-CONVENTIONALS  
TK57-Geomatrix, Inc.

ANALYTICAL  
RESOURCES  
INCORPORATED

Matrix: Water  
Data Release Authorized: *MP*  
Reported: 09/02/11

Project: FRP 2011 Shoreline Investiga  
Event: 8769  
Date Sampled: NA  
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
pH EPA 150.1	ICVL	08/31/11	std units	6.98	7.00	0.02

pH is evaluated as the Absolute Difference between the values rather than Percent Recovery.